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IS 15500-1 to 8 (2004): Deepwell handpumps components and special tools (amalgamation of IS 9301, 13056, 13287, 14101, 14102, 14103, 14104, 14105 and 14107) [MED 27: Handpumps]

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IS 15500 (Parts 1 to 8) : 2004

(Amalgamating IS 9301 : 1990,
IS 13056 : 1991, IS 13287 : 1992,
IS 14101 : 1994, IS 14102 : 1994,
IS 14103 : 1994, IS 14104 : 1994,
IS 14105 : 1994 and IS 14107 : 1999)

(Reaffirmed - 2010)

भारतीय मानक

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Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

ICS 23.080

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2004 **Price Group 20**

Handpumps Sectional Committee, ME 27

FOREWORD

This Indian Standard (Parts 1 to 8) was adopted by the Bureau of Indian Standards, after the draft finalized by the Handpumps Sectional Committee had been approved by the Mechanical Engineering Division Council.

The need for deepwell handpumps of proven design to ensure interchangeability of components, having a long working life and requiring minimum possible maintenance, had resulted in initiation of work to bring out a standard on the subject. As a result of the combined efforts made in this direction by various voluntary organizations, government agencies and reputed manufacturers as well as by UNICEF, a standard on deepwell handpumps IS 9301 'Deepwell handpums — Specification' was first issued in 1979. This type of deepwell handpump is also popularly known as India Mark II handpump.

The first revision of IS 9301which was issued in 1982 was taken up in order to bring the standard in line with the then manufacturing practices. A number of modifications were incorporated in the first revision, of which the following were important:

a) The requirements of galvanizing was incorporated so that the pumps were free of rust for longer periods.
b) The 'performance test' given in the 1979 version was designated as the 'type test' and a new clause on 'routine test' was included.

The second revision of IS 9301 was brought out in 1984 in order to bring the standard in line with the techniques then prevalent for the manufacture of deepwell handpumps. The following were some of the important changes made in the second revision:

a) Tolerances on some of the dimensions had been changed, and specified on the basis of IS 919 (Part 1) : 1963 'Recommendations for limits and fits for engineering: Part 1 General engineering (*first revision*)'.
b) Stainless steel had been specified as the material for manufacturing handle axle.
c) Solid triangular gusset at the top and bottom of the handle bracket were provided.
d) Connecting rods and plunger rod had been provided with hexagonal couplers in place of locknuts.
e) 40 mm tank spout had been specified in place of 32 mm one in order that the tank is immediately cleared of the water and there is no undue splash.
f) Rear two stand legs at 80° had been specified in place of 120° in order to increase the stability of the pump.
g) Painting had been deleted as an anti-corrosive treatment for steel components.

The third revision of IS 9301 was brought out in 1990 to bring the standard in line with the then prevailing manufacturing practices. The following changes were made in the third revision:

a) Stainless steel plunger rod and connecting rods incorporated.
b) Relief groove for handle axle specified.
c) Telescopic stand assembly included.
d) Stand assembly modified by providing spikes.
e) Design of reducer cap and cylinder body modified to prevent slippage.
f) Upper valve modified in two parts for eliminating failure due to unscrewing of upper valve seat retainer.
g) Welding of stainless steel components specified.
h) Critical dimensions, in the figures, identified for inspection purposes.
j) Nitrile cup washers had been introduced to improve life of the pump. However, leather cup washers was intended to be phased out in two years time.
k) Bearing housing had been modified for minimizing distortion due to welding.
m) Third plate had been introduced for easy maintenance.

n) Type test had been deleted.
p) Stroke length had been increased.
q) Discharge requirement increased from 12.0 litre to 15.0 litre during discharge test.
r) Height of water tank increased from 129 mm to 154 mm.

Since the development of deepwell handpump, considerable progress has been made in its refinement. Efforts of different organizations and individuals including UNICEF, UNDP/World Bank Water and Sanitation Programme contributed to design improvement, increased reliability and simplified maintenance.

The outcome of these developmental efforts was the emergence of a handpump designated VLOM — Village Level Operation and Maintenance deepwell handpumps with open top cylinder. Design of this handpump is such that the most common repair can be done by local mechanics. Modifications incorporated in this pump simplify maintenance procedure and reduce maintenance cost. The basic difference of this pump with deepwell handpump (IS 9301) is that this pump has open top cylinder which facilitates pulling out of plunger assembly and check valve assembly from the cylinder without pulling out the riser main and the cylinder.

This type of pump is popularly known as India Mark III deepwell handpump and the relevant Indian Standard IS 13056 'Deepwell handpumps (VLOM) — Specification' was issued in 1991.

The initial additional investment and installation depth limitation had been identified as main constraints in adoption of VLOM pumps. Moreover increased static load of riser main and weight of water column also resulted in observation of shearing of riser pipe near the riser pipe holder in few cases. As a result, a smaller size cylinder (50 mm) was developed to overcome such problems experienced in 65 mm cylinder. After successful trials of 50 mm cylinder for over 5 years, these were ultimately included in VLOM pump specification (IS 13056). The major advantages over 65 mm cylinder were the lower capital cost, reduced static load and weight of water column to support and ease in installation and maintenance.

As in some of the states, the static water level had gone below 40 m, the existing deepwell handpumps (IS 9301) were difficult to operate and therefore it was felt necessary to design a separate pump for such purposes. The objective set out for the development of the extra deepwell handpumps were:

a) to design a system, which allows the use and interchangeability of most of the components with the existing deepwell handpumps (IS 9301), and
b) to keep operational efforts within reasonable limits.

This led to the emergence of India Mark II extra deepwell handpump and the relevant Indian Standard IS 13287 was issued in 1992.

After publication of these handpump standards, based on the experience gained during manufacture, inspection, installation and their maintenance, six amendments were issued to India Mark II handpump — Specification [IS 9301 : 1990 (*third revision*)]. Similarly 6 amendments were issued to VLOM pump — Specification (IS 13056 : 1991) and 4 amendments were issued in Extra deepwell handpump — Specification (IS 13287 : 1992), to keep abreast with the technological changes.

Over the years, demand had been generated to prepare a comprehensive document to cover all the three types of handpumps for lifting water from deep set bore wells, water depth ranging from 20 m to 90 m. Further the need was also felt to incorporate the requirements of components and special tools used in repair/maintenance of these pumps to enable the users/purchasers to procure components as per this standard to ensure quality and interchangeability. As a result, this Indian Standard has been formulated amalgamating following Indian Standards:

IS No.	*Title*
9301 : 1990	Deepwell handpumps — Specification (*third revision*)
13056 : 1991	Deepwell handpumps (VLOM) — Specification
13287 : 1992	Extra deepwell handpumps — Specification
14101 : 1994	Deepwell handpumps — Components — Cast iron — Specification
14102 : 1994	Deepwell handpumps — Components — Leaded tin bronze — Specification
14103 : 1994	Deepwell handpumps — Components — Mild steel — Specification
14104 : 1994	Deepwell handpumps — Components — Nitrile rubber — Specification
14105 : 1994	Deepwell handpumps — Components — Stainless steel — Specification
14107 : 1999	Special tools for deepwell handpumps — Specification

All the amendments issued so far in the above specifications have been reviewed and incorporated wherever required in this standard.

On publication of this standard, the above Indian Standards would be withdrawn.

The formulation of amalgamated standard entailed the review of identification and packaging of handpump components covered in IS 12732 : 1989 'Nomenclature, identification and packaging of components for deepwell handpumps'. It was felt that the packaging requirements should also be part of this amalgamated standard. Hence accordingly packaging requirements have also been included in this amalgamated standard. On publication of this standard, IS 12732 would also be withdrawn.

It is expected that publication of the amalgamated document would facilitate all the concerned organizations involved in development, manufacture, inspection, installation and maintenance activities, ultimately improving the availability of safe drinking water to communities.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

CONTENTS

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Part 3	Handpump Sub-Assemblies	13
Part 4	Steel Components	26
Part 5	Cast Iron Components	50
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AMENDMENT NO. 3 JUNE 2012
TO
IS 15500 (PARTS 1 TO 8) : 2004 DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

(*Page* 1, *Part* 1, *clause* **1.3**, *tenth line*) — Substitute 'Brass/bronze or stainless steel cast components' *for* 'Brass/bronze components'.

(*Page* 3, *Part* 1, *clause* **5.2.2**) — Insert the following new clause after **5.2.2**:

'**5.2.3** Components covered in Part 6 (*Fig*. 6.2 to *Fig*. 6.16) of the specification may be manufactured from stainless steel casting. The material of steel casting shall meet the requirements of IS 3444 : 1989 Grade 1 for Chemical and Mechanical properties.'

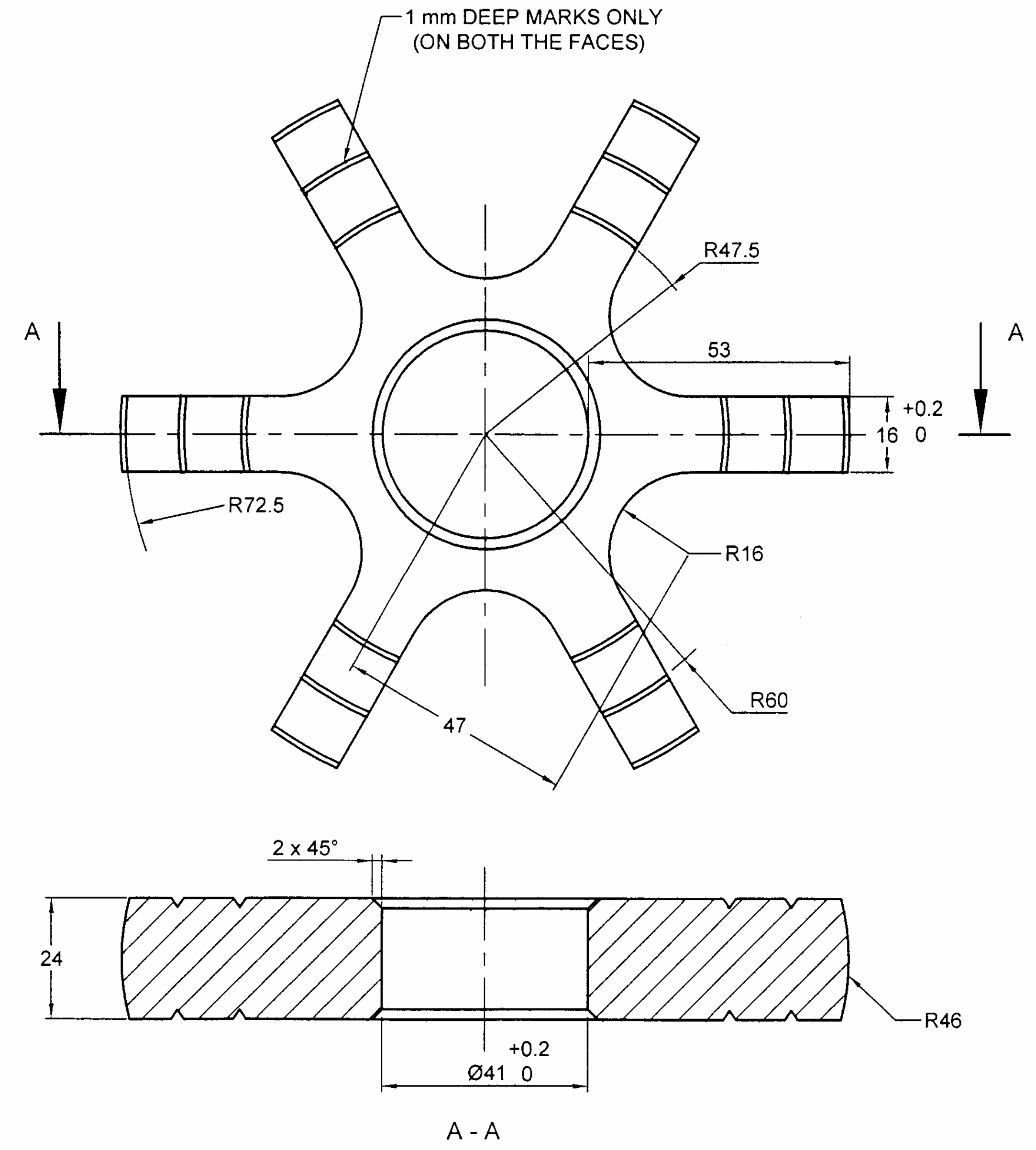
(*Page* 57, *Part* 6, *clause* **1.1**, *second line*) — Add 'or stainless steel cast' after 'bronze'.

(*Page* 57, *Part* 6, *Title*, *fourth line*) — Substitute 'BRASS/BRONZE OR STAINLESS STEEL CAST COMPONENTS' *for* 'BRASS/BRONZE COMPONENTS'.

[*Page* 62, *Part* 6, *Fig*. 6.11 (*see also Amendment No*. 1)] — Substitute '$16^{0}_{-0.5}$' *for* '$17^{0}_{-0.3}$'.

(*Page* 66, *Part* 7, *clause* **2.1**, *third line*) — Substitute '7.16' *for* '7.15'.

(*Page* 71, *Part* 7, *Fig.* 7.15) — Add Fig. 7.16 as given below:



NOTES

1 Minimum 3 centralizers should be provided; first at joint to top reducer cap of cylinder, second approximately at middle of riser pipe line and third at the bottom of top riser pipe.

2 The above centralizer is suitable for 150 NB casing pipe. It may be trimmed at R60 and R47.5 marks for use with casing pipe of 125 and 100 NB respectively.

Shore hardness 80 ± 5 on scale A.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 7.16 PIPE CENTRALIZER — STANDARD (SDWP)

(MED 27)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 MAY 2009
TO
IS 15500 (PARTS 1 TO 8) : 2004 DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

(*Page* 3, *clause* **5.1.1**) — Insert the following line at the end:

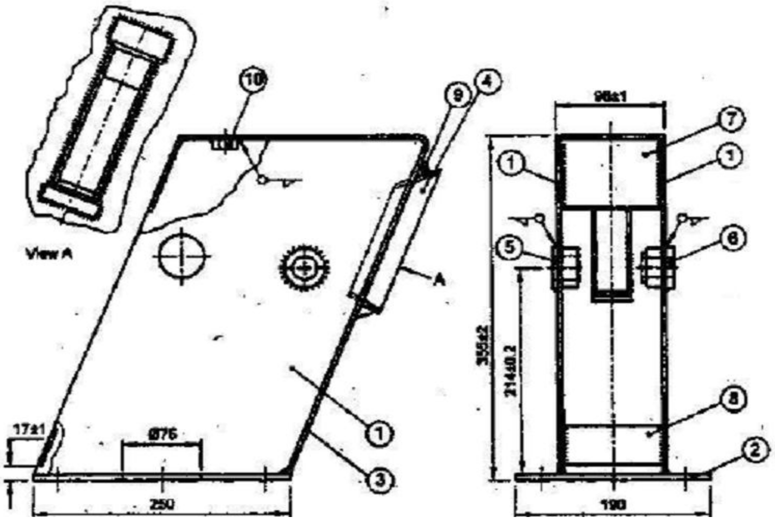
'Front cover of Head Assembly shall be made from 'O grade' CRS Sheet of IS 513 : 1994.'

(*Page* 3, *clause* **5.2.1**) — Substitute 'Tensile strength 800 MPa, *Min*' *for* 'Tensile strength 1 030 MPa, *Min*'.

(*Page* 3, *clause* **5.6.2**, *Shore hardness on A scale*) — Substitute 'shall be as specified in the Fig. 7.1 to 7.15' *for* '80 $^{+5}$ '.

PART 4 STEEL COMPONENTS

(*Page* 27, *Fig*. 4.1) — Substitute the following for the existing figure:



10	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
9	2	Gusset — Standard	Fig. 4.3K	Mild Steel	Grade A IS 2062
8	1	Front Bottom End Plate	Fig. 4.3J	Mild Steel	Grade A IS 2062
7	1	Front Top End Plate	Fig. 4.3I	Mild Steel	Grade A IS 2062
6	1	Axle Bush — Left	Fig. 4.3H	Mild Steel	Grade A IS 2062
5	1	Axle Bush — Right	Fig. 4.3G	Mild Steel	Grade A IS 2062
4	1	Bracket — Standard	Fig. 4.3D	Mild Steel	Grade A IS 2062
3	1	Back Plate — Standard	Fig. 4.3C	Mild Steel	Grade A IS 2062
2	1	Head Flange	Fig. 4.3B	Mild Steel	Grade A IS 2062
1	2	Side Plate	Fig. 4.3A	Mild Steel	Grade A IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

1 Inside fillet welding of side plates and back plate to flange should be 3.2 mm, *Min*.

2 Welding fillet in other places should be 4 mm, *Min*.

3 The side plate shall be welded inside and outside as shown in the drawing.

4 The head assembly shall be welded inside and outside. The outside seal welding run shall be ground smooth.

5 Reaming of the left and right axle bushes shall be done to ensure internal dimensions and alignment.

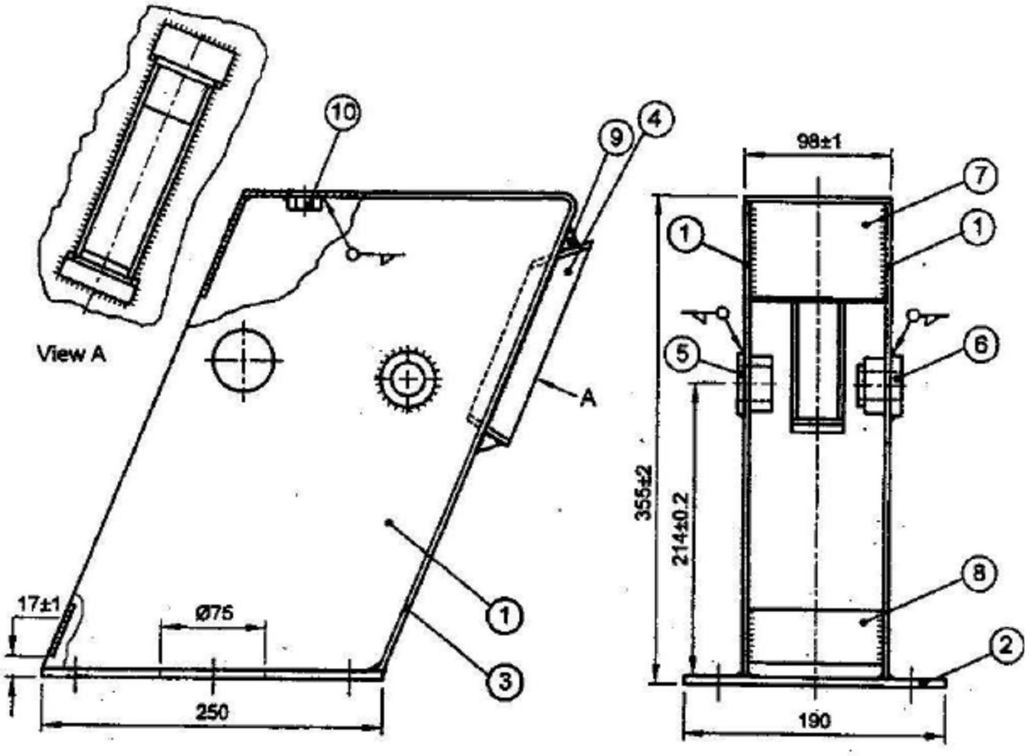
Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.1 HEAD — STANDARD
(For SDWP, VLOM-65 and VLOM-50)

Price Group 2

(*Page* 28, *Fig.* 4.2) — Substitute the following for the existing figure:



Part No.	No. Off	Description	Reference	Material	
10	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
9	2	Gusset — EDWP	Fig. 4.3L	Mild Steel	Grade A IS 2062
8	1	Front Bottom End Plate	Fig. 4.3J	Mild Steel	Grade A IS 2062
7	1	Front Top End Plate	Fig. 4.3I	Mild Steel	Grade A IS 2062
6	1	Axle Bush — Left	Fig. 4.3H	Mild Steel	Grade A IS 2062
5	1	Axle Bush — Right	Fig. 4.3G	Mild Steel	Grade A IS 2062
4	1	Bracket — EDWP	Fig. 4.3F	Mild Steel	Grade A IS 2062
3	1	Back Plate — EDWP	Fig. 4.3E	Mild Steel	Grade A IS 2062
2	1	Head Flange	Fig. 4.3B	Mild Steel	Grade A IS 2062
1	2	Side Plate	Fig. 4.3A	Mild Steel	Grade A IS 2062

NOTES

1 Inside fillet welding of side plates and back plate to flange should be 3.2 mm, *Min*.

2 Welding fillet in other places should be 4 mm, *Min*.

3 The side plate shall be welded inside and outside as shown in the drawing.

4 The head assembly shall be welded inside and outside. The outside seal welding run shall be ground smooth.

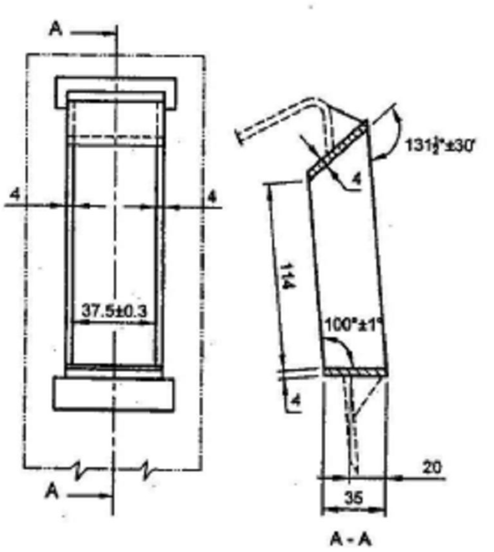
5 Reaming of the left and right axle bushes shall be done to ensure internal dimensions and alignment.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.2 HEAD — EDWP

(*Page* 30, *Fig.* 4.3D) — Substitute the following for the existing figure:



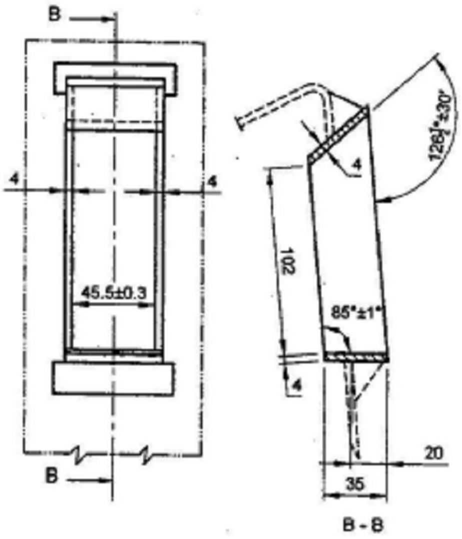
4.3D Bracket — Standard
(For SDWP, VLOM-65 and VLOM-50)

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.3 PARTS OF HEAD (*Continued*)

(*Page* 31, *Fig.* 4.3F) — Substitute the following for the existing figure:



4.3F Bracket — EDWP

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.3 PARTS OF HEAD (*Continued*)

(*Page* 59, *Fig.* 6.2) — Substitute ‘6.5 min.’ *for* ‘6 min.’.

(*Page* 61, *Fig.* 6.8) — Substitute ‘Ø 26.5 ± 0.2’ *for* ‘Ø 26 ± 0.2’.

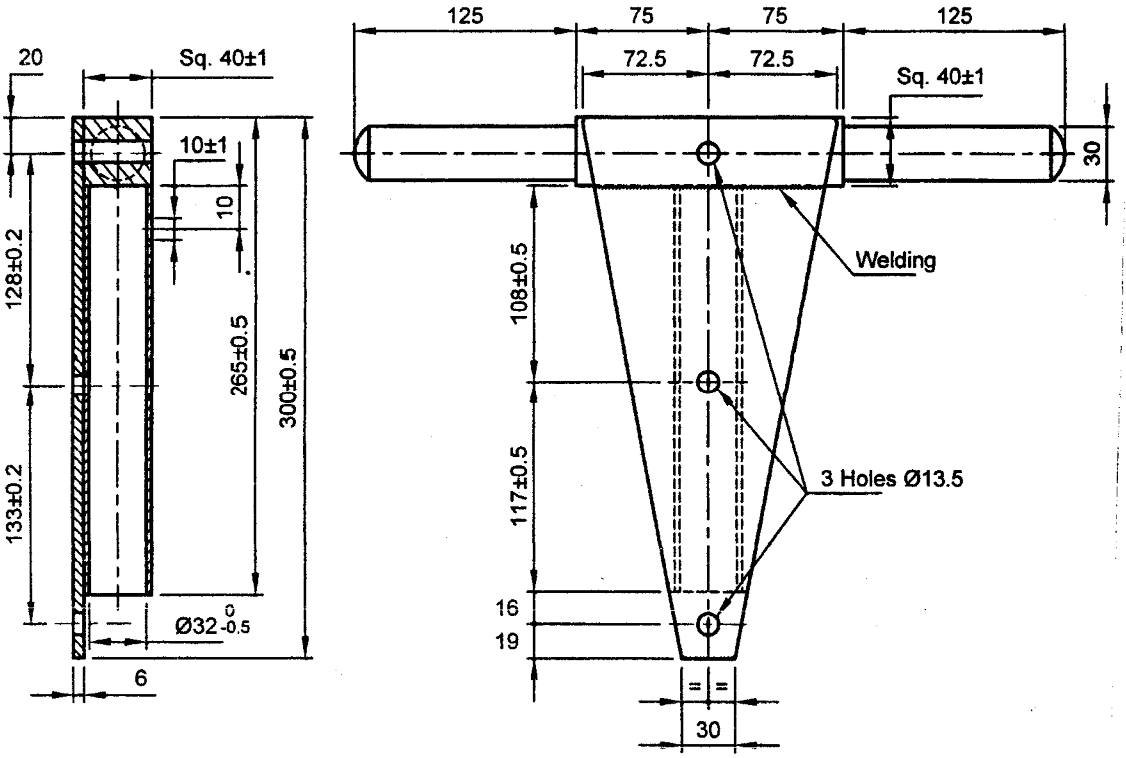
(MED 27)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 MARCH 2007
TO
IS 15500 (PARTS 1 TO 8) : 2004 DEEP WELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

(*Page* 3, *Part* **1**, *clause* **5.2.1**, *second line*) — Substitute 'Steel designation X04 Cr 19 Ni 9' *for* 'Grade 04 Cr 18 Ni 10'.

(*Page* 38, *Part* **4**, *Fig.* **4.10**) — Substitute the following for the existing figure:



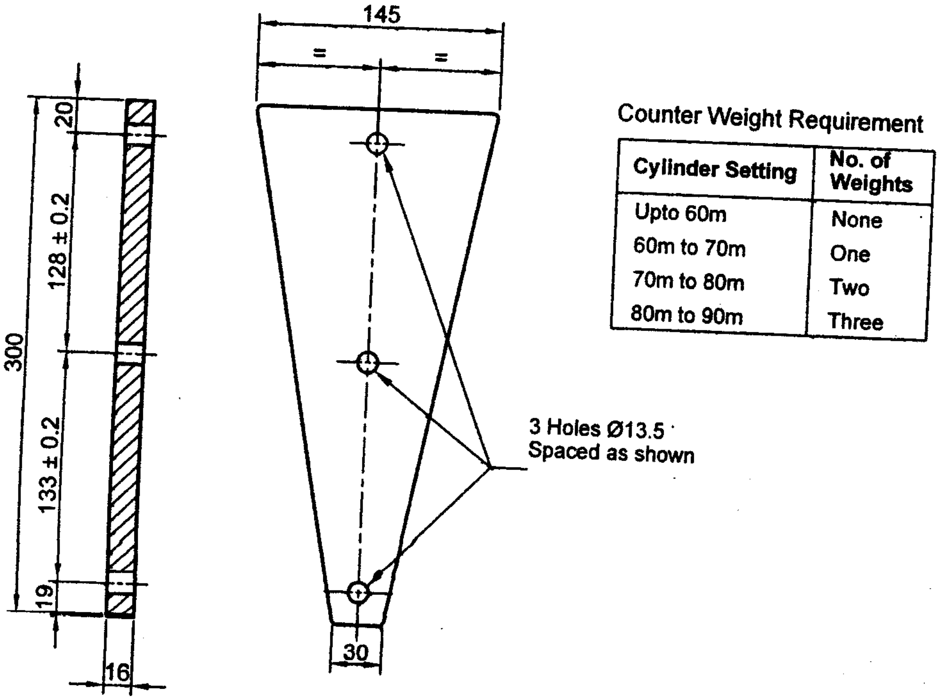
Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres

FIG. 4.10 T-BAR
(For EDWP only)

Price Group 3

(*Page* 38, *Part* **4**, *Fig.* **4.11**) — Substitute the following for the existing figure:



Counter Weight Requirement

Cylinder Setting	No. of Weights
Upto 60m	None
60m to 70m	One
70m to 80m	Two
80m to 90m	Three

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

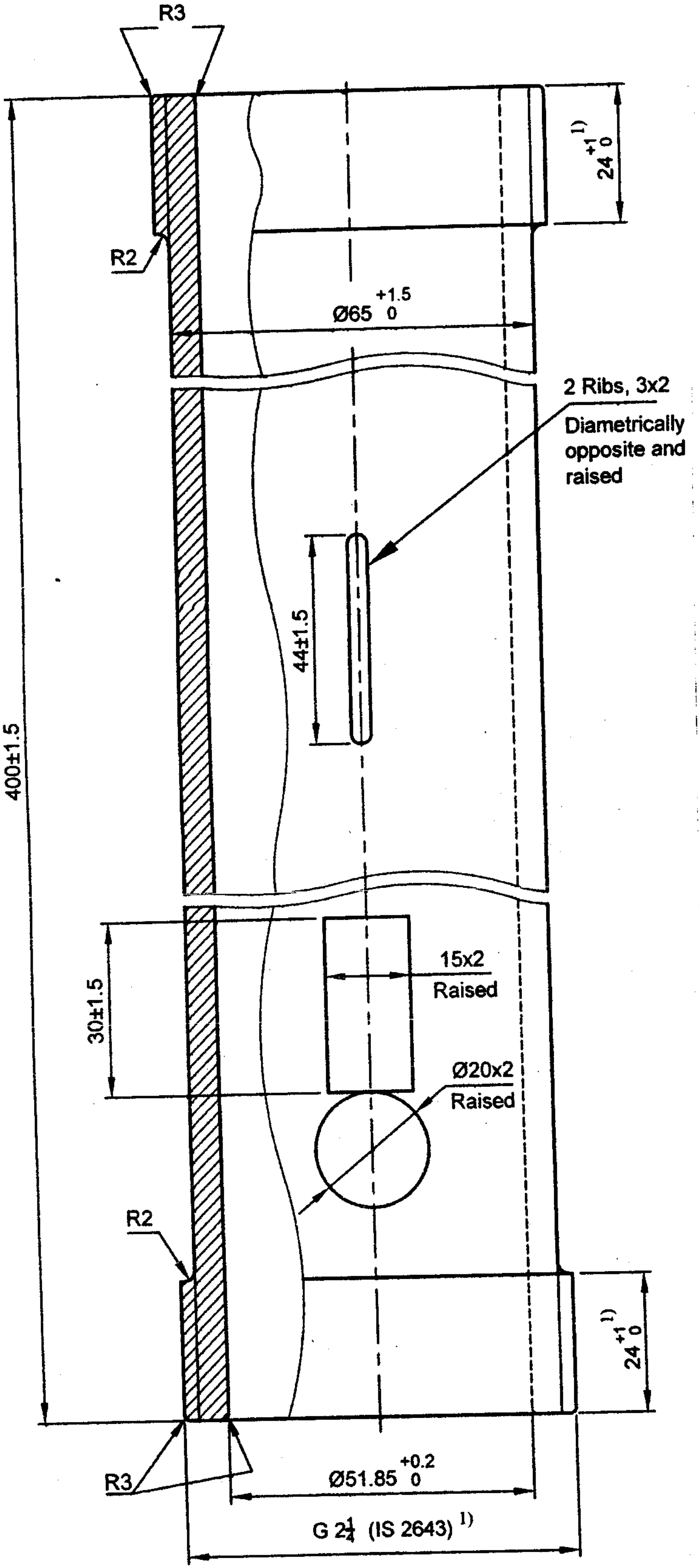
FIG. 4.11 COUNTER WEIGHT
(For EDWP only)

(*Page* 41, *Part* **4**, *Fig.* **4.14F**) — Substitute '5' *for* '5.15'.

[*Page* 41, *Part* **4**, *Fig.* **4.14F** (*upper text*)] — Substitute 'To suit OD of 150 NB Pipe (medium)' *for* 'To suit OD of 175 NB Pipe (medium)'.

(*Page* 49, *Part* **4**, *Fig.* **4.28**) — Substitute '51 minimum' *for* '50±2'.

(*Page* 53, *Part* 5, *Fig.* **5.3**) — Substitute the following for the existing figure:

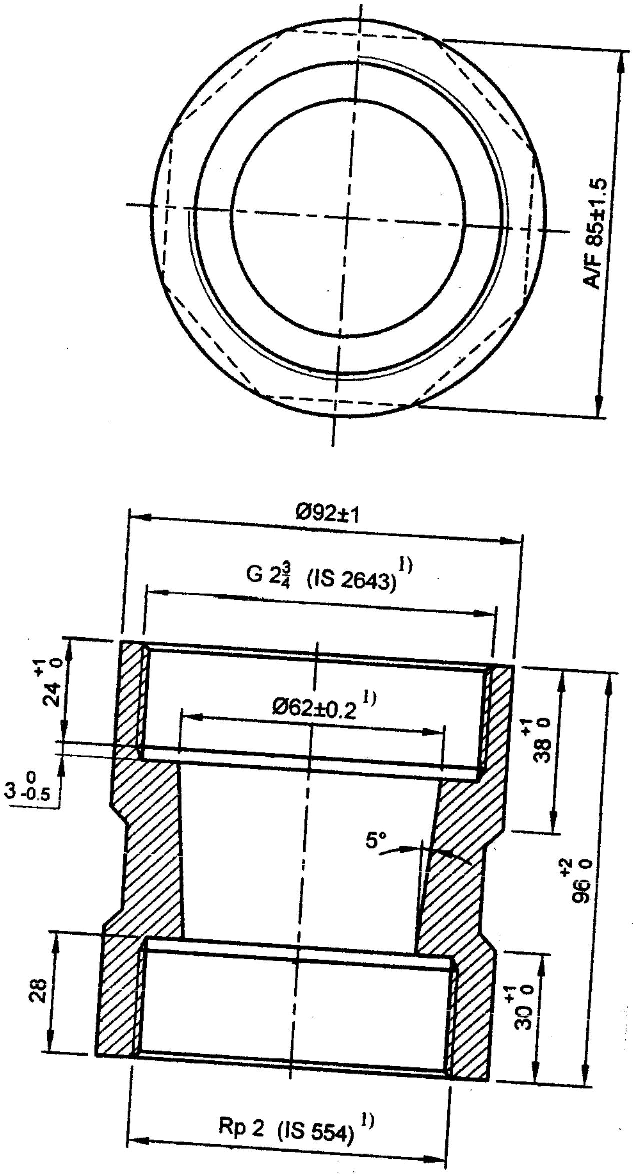


1) Indicates critical dimensions

All dimensions in millimetres

FIG. 5.3 CYLINDER BODY-VLOM 50

(*Page* 55, *Part* **5**, *Fig.* **5.5B**) — Substitute the following for the existing figure:



5.5B BOTTOM CAP - VLOM-65

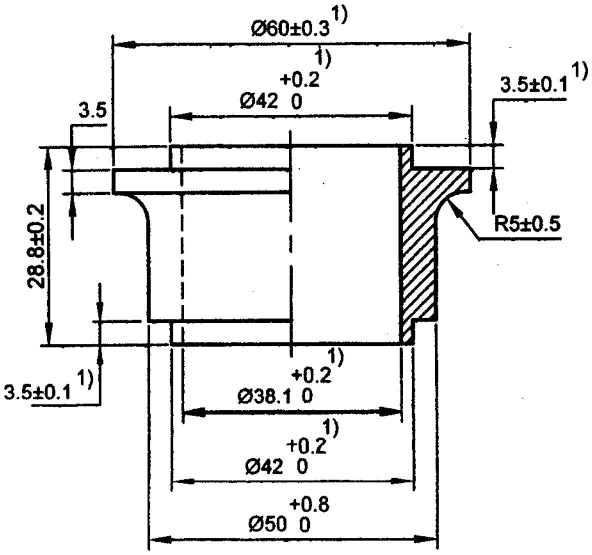
1) Indicates critical dimensions

All dimensions in millimetres

(*Page* 59, *Part* **6**, *Fig.* **6.2**) — Substitute 'Ø49' *for* 'Ø44'.

(*Page* 59, *Part* **6**, *Fig.* **6.2**) — Substitute '19 $^{0}_{-0.2}$' *for* '16 $^{0}_{-0.2}$' and substitute '19 A/F' *for* '18 A/F' in the first line of 'NOTE'.

(*Page* 59, *Part* **6**, *Fig.* **6.4**) — Substitute the following for the existing figure:

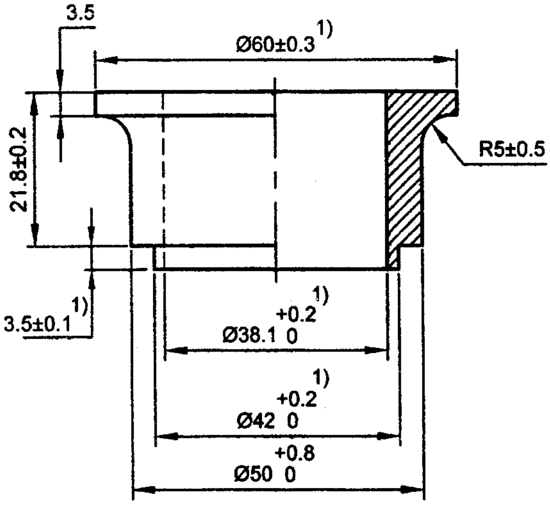


1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.4 BUCKET SPACER-STANDARD
(For SDWP, EDWP & VLOM 65)

(*Page* 59, *Part* **6**, *Fig.* **6.5**) — Substitute the following for the existing figure:

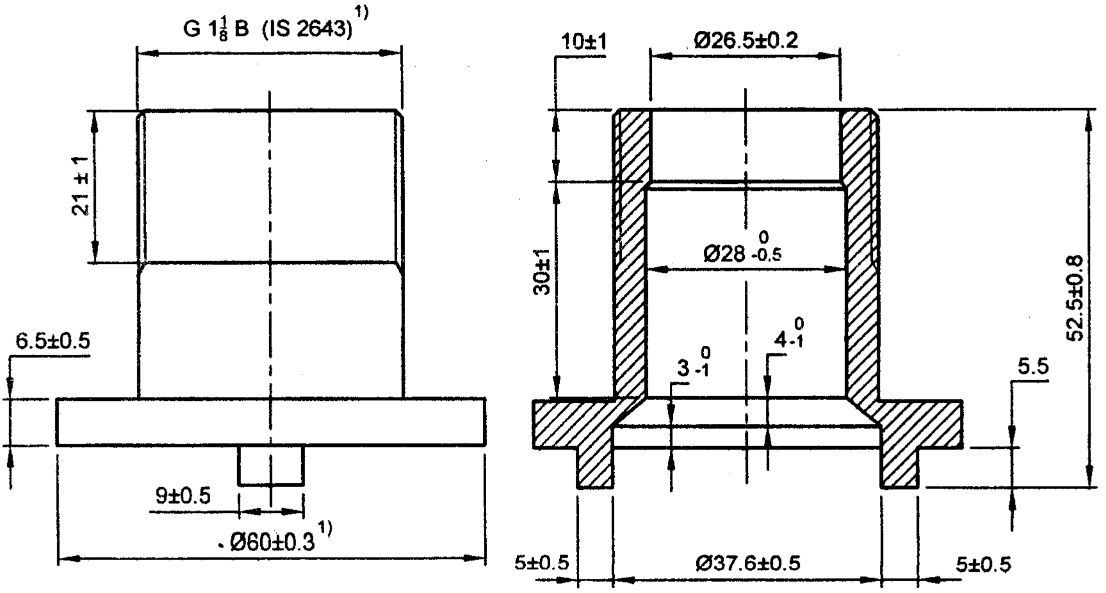


1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.5 BUCKET SPACER-LOWER
(For EDWP)

(*Page* 60, *Part* **6**, *Fig.* **6.6**) — Substitute the following for the existing figure:



1) Indicates critical dimensions

All dimensions in millimetres

FIG. 6.6 FOLLOWER-SDWP

(*Page* 62, *Part* **6**, *Fig.* **6.11**) — Substitute '$17^{\ 0}_{-0.3}$' *for* '$16^{\ 0}_{-0.5}$'.

(*Page* 103, *Part* **8**, *Fig.* **8.3.3**, *fourth column of the table*) — Substitute 'Fig. 8.2.4B' *for* 'Fig. 8.3.4D'.

(ME 27)

Reprography Unit, BIS, New Delhi, India

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 1 GENERAL

1 SCOPE

1.1 This part covers the following handpumps, including components thereof and special tools required for their installation/maintenance, suitable for lifting water from deep set borewells, covering static water level (SWL) range from 20 m to 90 m:

Deepwell handpump — STANDARD (SDWP)
Deepwell handpump — VLOM 65 (VLOM-65)
Deepwell handpump — VLOM 50 (VLOM-50)
Deepwell handpump — EXTRA DEEP (EDWP)

1.2 The size of the borewell and the range of static water level for each pump is given in Table 1.

Table 1 Borewell and Range of Static Water Level for Pumps

Sl No.	Handpump Type	Borewell/ Casing Size (NB, *Min*)	SWL (Range)
		(mm)	(m)
(1)	(2)	(3)	(4)
i)	STANDARD	100	20-40
ii)	VLOM-65	125	20-30
iii)	VLOM-50	100	20-50
iv)	EXTRA DEEP	100	40-90

1.3 The construction, dimensions, materials and other specifications of the pumps, their components, and special tools have been categorized in the following eight parts:

Part 1	General
Part 2	Handpumps
Part 3	Handpump sub-assemblies
Part 4	Steel components
Part 5	Cast iron components
Part 6	Brass/bronze components
Part 7	Rubber components
Part 8	Special tools

1.3.1 The requirements of this part shall be followed in all other parts wherever applicable.

2 REFERENCES

The standards listed at Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

3 NOMENCLATURE

A brief description of the main constituents of a deepwell handpump is given in Fig. 1.1.

3.1 Pump Head Assembly

The above ground mechanism operating the plunger.

3.2 Cylinder Assembly

Contains plunger, check valve, etc, lifting water upward in each stroke.

3.3 Connecting Rod

Provides linkage between the pump head and cylinder.

3.4 Riser Pipe

Carries water from the cylinder to the water tank.

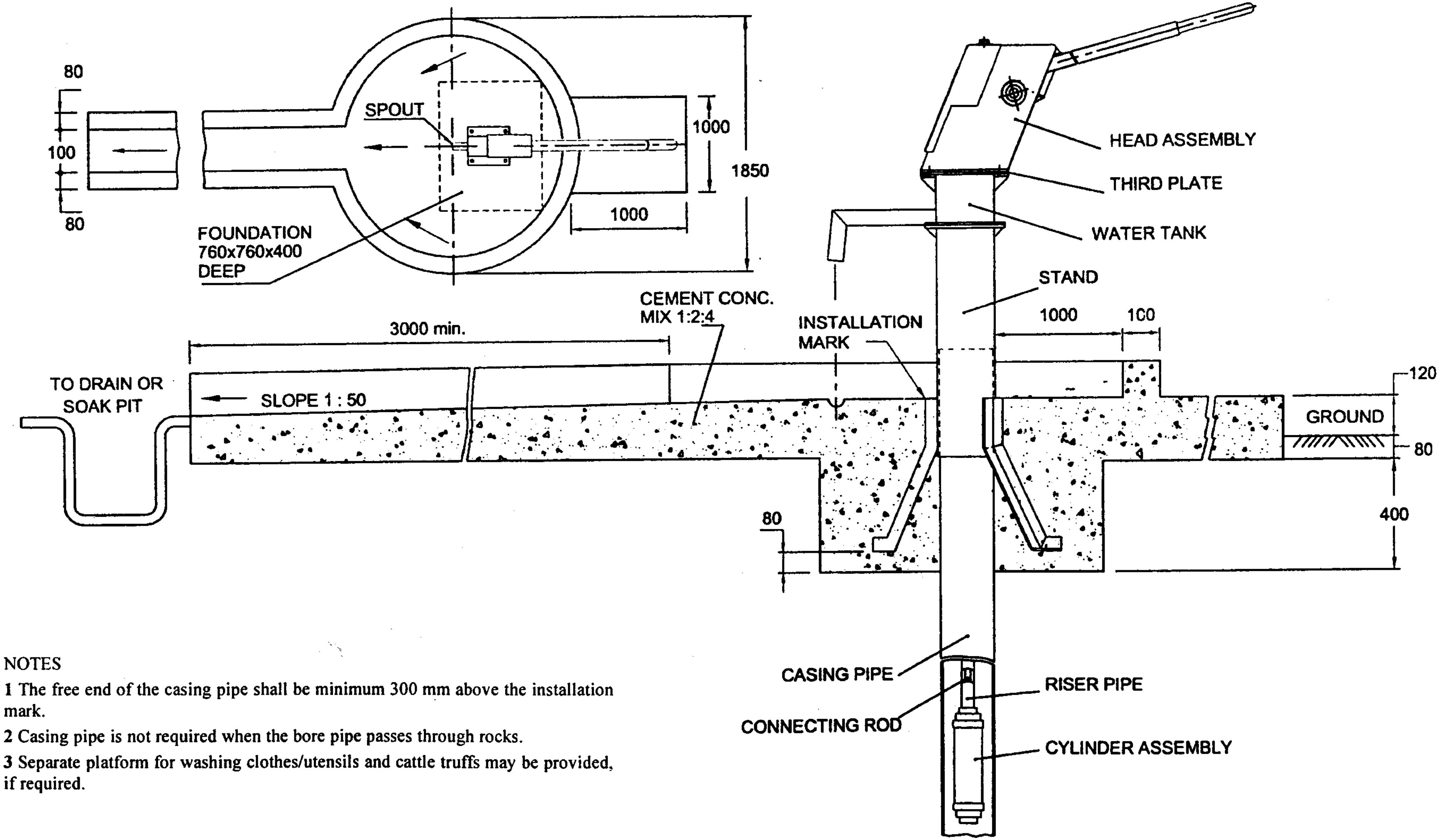
4 DIMENSIONS AND TOLERANCES

4.1 The material, dimensions and tolerances for different components/assemblies shall be as provided in respective figures given in Parts 2 to 8.

NOTE — Figure pertaining to a specific pump or pumps, has an indication to this regard in its title. The figures without such reference are common to all the pumps.

4.2 Unless otherwise specified, the tolerance on the un-machined dimensions related to the following items used in the pump production, shall be governed by their respective Indian Standards:

a) Hot/cold rolled carbon steel plates, sheets, flat and bars;
b) Steel sections;
c) Brass tube; and
d) Cast iron/bronze castings.



NOTES

1 The free end of the casing pipe shall be minimum 300 mm above the installation mark.

2 Casing pipe is not required when the bore pipe passes through rocks.

3 Separate platform for washing clothes/utensils and cattle truffs may be provided, if required.

All dimensions in millimetres.

FIG. 1.1 TYPICAL SET-UP FOR DEEPWELL HANDPUMP

4.2.1 For all other linear and angular dimensions (including fillet radii and chamfer height) where tolerances are not specified, the tolerance as per Class C (coarse) of IS 2102 (Part 1) shall be followed for the manufacturing of the components. However, as also stated in 6 of the referred standard, any deviation on such dimensions, observed during the inspection of the final product, shall not lead to rejection unless it adversely affects the performance and durability of the component/assembly/handpump.

4.3 Some components are likely to undergo minor changes in the dimensions after welding and/or anti-corrosive treatment, The dimensions on such components shall be checked before the above processes.

4.4 The tolerance of metric thread shall conform to IS 14962 (Part 3), Class 6g for bolts and 6H for nuts.

4.5 Till such time adequate gauging practices are available for knuckle threads, interchangeability between the mating components shall be ensured.

4.6 The standard parts like fasteners, ball bearings etc, used in the handpump assembly and sub-assemblies shall be as per specifications given in Annex B.

4.6.1 All bolts, nuts and washers except high tensile bolts shall be electro-galvanized conforming to IS 1367 (Part 11).

5 RAW MATERIALS

5.1 Steel

5.1.1 The mild steel plates/sheets, angle iron, seamless tube, round/square bars used for the manufacture of the pump components shall conform to Grade A of IS 2062.

5.1.2 The mild steel bright bar shall be of Type 4 of IS 9550 with mechanical properties as follows:

Tensile strength	540-790 MPa, and
Elongation	12 percent, *Min*

5.1.3 The hexagonal coupler, generally manufactured from cold drawn bars shall be stress relieved before welding to avoid cracks.

5.2 Stainless Steel

5.2.1 The material for stainless steel connecting rod and plunger rod shall conform to Grade 04 Cr 18 Ni 10 of IS 6603 with following mechanical properties:

Tensile strength	1 030 Mpa, *Min*
Elongation	15 percent, *Min*

5.2.2 The handle axle and push rod shall be manufactured from stainless steel having following properties:

Chemical Composition

Carbon	0.12-0.25 percent
Manganese	14-15 percent
Chromium	16.5-18 percent
Nickel	1-1.75 percent
Nitrogen	0.32-0.40 percent
Phosphorus	0.030 percent, *Max*
Sulphur	0.030 percent, *Max*
Silicon	0.5 percent, *Max*

Physical Properties

Yield strength	448 MPa, *Min*
Tensile strength	758 MPa, *Min*
Elongation	30 percent, *Min*
Hardness	98 HRB, *Max*

5.3 Cast Iron

Grey iron castings shall conform to Grade FG 200 or higher grade of IS 210.

5.4 Brass

The brass tube used for cylinder lining shall conform to grade Cu Zn 30 As of IS 407 and shall be temper annealed.

5.5 Bronze

5.5.1 Bronze castings shall conform to Grade LTB 2 of IS 318 with hardness 55 HB, *Min.* Alternatively Naval Brass conforming to IS 6912 can be used to forge the components.

5.5.2 Bronze castings shall be free from lead segregation.

5.6 Rubber

5.6.1 Rubber components shall be manufactured from nitrile rubber compound as established by test method given in IS 3400 (Part 22).

5.6.2 The physical properties of nitrile rubber components shall be as given below:

Shore hardness on A scale	80^{+5}_{-4}
Tensile strength	12.6 MPa, *Min*
Elongation at break	150 percent, *Min*
Compression set, 24 h at 70°C	20 percent, *Max*
Volume change, 22 h at 40°C	$^{+25}_{0}$ percent

The above properties shall be checked as per the following Indian Standards:

Shore hardness	IS 3400 (Part 2)
Tensile strength, elongation	IS 3400 (Part 1)
Compression set	IS 3400 (Part 10)
Volume change	IS 3400 (Part 6)

5.6.3 If it is not possible to carry out some tests on the component itself, test shall be carried out on press cured slabs made from the same mix and vulcanized as closely as possible to the same degree as the component.

5.7 Test Records

5.7.1 The manufacturer shall maintain the record of test certificates for each batch of the raw materials procured and used for manufacture of the components (both for in-house or outsourced items).

5.7.2 Daily production records shall be correlated with the raw material batch used in production.

6 ANTI-CORROSIVE TREATMENT

6.1 Electro-galvanizing

The following components shall be electro-galvanized and passivated conforming to service condition No. 4 of IS 1573:

a) Connecting rod (mild steel),
b) Bearing spacer, and
c) Washer.

6.1.1 The cleaning of electro-galvanized threads is permitted to achieve necessary fitment.

6.2 Galvanizing

The following parts shall be hot dip galvanized according to IS 4759:

a) Stand,
b) Water tank,
c) Head,
d) Cover,
e) Handle,
f) Third plate,
g) T-bar (EDWP),
h) Counter weight (EDWP),
j) Socket for riser pipe, and
k) Cone plate.

6.2.1 Galvanized assemblies shall be given chromate conversion coating according to **5.9** of IS 2629.

6.3 Painting

6.3.1 Exterior surfaces of cast iron components shall be given the following treatment:

a) One coat of red oxide primer, conforming to IS 2074.
b) Two coats of synthetic enamel paint conforming to IS 2932.

6.3.2 Chain coupling shall be given a coating each of epoxy primer and paint.

6.3.3 Chain assembly shall be boiled in graphite grease for better anti-corrosion.

7 WORKMANSHIP

7.1 All components shall be free from rough edges, burrs and other surface defects. The sharp machined-edges shall be filed smooth.

7.2 Flanges shall be reasonably flat to provide proper matching of the holes to ensure unrestricted insertion of the bolts when assembled with counterpart.

7.3 Castings shall be sound, clean and free from gas cavities, blowholes, hard spots, cold shuts, distortion and other harmful defects. They shall be well dressed and fettled.

7.3.1 Unless otherwise specified, the castings shall have all edges rounded off and corners filleted to 3 mm radius.

7.3.2 Castings shall not be repaired or welded.

7.4 The brass liner shall have smooth finish and shall be free from pitting and scoring mark. No cracks in brass tube shall be permissible on flaring.

7.5 Welding

7.5.1 Welding of mild steel components shall be done in accordance with IS 9595.

7.5.2 Welding for stainless steel components shall conform to IS 2811. Alternatively, stainless steel components may be welded by manual arc welding using suitable electrodes conforming to IS 5206.

7.5.3 Unless otherwise specified, the minimum specified thickness of the metal to be welded shall be the guiding factor for deciding the weld fillet size. It shall normally be not less than the metal specified thickness of the metal to be welded.

7.5.4 All welding shall be free from blow holes, pin holes, cracks, etc.

8 RISER PIPES

8.1 Riser pipes shall be hot dipped galvanized, screwed and socketed pipe conforming to IS 1239 (Part 1) medium class with special emphasis on the requirements given in **6.4**. Pipe ends shall have smooth finish and shall be free of burrs or sharp machining chip. Internal surface of pipes shall not have any lump of zinc. One end of each riser pipe shall be fitted with a hot dipped galvanized socket and the other end with a thread protector. The nominal bore and length of each pipe for different handpumps shall be as given in Table 2.

Table 2 Riser Main Details

(*Clause* 8.1)

Sl No.	Handpump Type	Riser Main Details		
		Pipe Size mm		Socket
		NB	Length	(Figure Ref)
(1)	(2)	(3)	(4)	(5)
i)	STANDARD	32	$3\,000_{-25}^{\;0}$	Fig. 4.28
ii)	VLOM-65	65	$3\,000_{-50}^{\;0}$	Fig. 4.30
iii)	VLOM-50	50	$3\,000_{-50}^{\;0}$	Fig. 4.29
iv)	EXTRA DEEP	32	$3\,000_{-25}^{\;0}$	Fig. 4.28

8.1.1 50 mm NB riser pipes shall pass free bore test using 50 mm diameter mandrel.

8.1.2 The socket for riser pipe shall be manufactured from seamless pipe according to IS 1239 (Part 2), or machined from solid bar conforming to Grade A of IS 2062 and shall be hot dipped galvanized. The dimensions of the socket shall be as per drawing mentioned in Table 2.

8.1.3 Poly-tetra-flouro-ethylene (PTFE) tape or its equivalent shall be used on the riser pipe joints before installation.

9 TESTING

9.1 Lot

For the purpose of testing, group of each type of assembly, sub-assembly or component covered in different parts shall be treated as a separate lot.

9.2 Visual Tests

All the constituents in a lot shall be examined for workmanship, finish and visual defects.

9.3 Sampling

9.3.1 Samples shall be drawn from the constituents of the lot conforming to the requirements given in **9.2**.

9.3.2 Unless otherwise specified in the contract or order, the procedure given in IS 2500 (Part 1) shall be followed for sampling inspection.

9.3.3 Unless otherwise mentioned, for the characteristics given in testing clause of all the parts, the single sampling plan with general inspection level I and AQL of one percent as given in Table I and II-A of IS 2500 (Part 1) shall be followed.

9.4 Dimensional and Other Tests

Samples drawn as per **9.3** shall be checked for the following tests depending on the assembly, sub-assembly or component the lot is comprised of.

9.4.1 *Head Assembly*

9.4.1.1 All flanges in the head assembly lot shall be reasonably flat to provide proper matching of the holes to ensure unrestricted insertion of the bolt.

9.4.1.2 The head assembly shall be put on the levelled water tank bolted to a stand and subjected to the checks given below:

a) The alignment of the chain with respect to the guide bush shall be checked. For this purpose a rod of 12 mm diameter and 100 mm length shall be fitted to the chain coupling. The handle shall be raised and lowered gently. The rod shall pass through the guide bush having a hole of 13.5 ± 0.5 mm, welded on a third plate specially fabricated for the test.

b) The handle shall have reasonably good surface contact with the top and bottom portions of the bracket.

c) The handle shall be checked for lateral play at the end of square section of the handle, which shall not exceed 2 mm on the either side.

d) The clearance between the handle and the bracket shall not be less than 1.5 mm.

e) The stroke of the pump shall be as provided in Table 3.

Table 3 Stroke Length and Discharge of Pumps

(*Clauses* 9.4.1.2 *and* 9.4.3.4)

Sl No.	Handpump Type	Stroke Length mm	Discharge Minimum litres
(1)	(2)	(3)	(4)
i)	STANDARD	125 ± 4	15
ii)	VLOM-65	125 ± 4	15
iii)	VLOM-50	125 ± 4	10
iv)	EXTRA DEEP	100 ± 4	12

9.4.1.3 All the head assemblies shall be dismantled and checked for the following:

a) The fitment of the bearings shall be checked for requirements given in **9.4.2.1**.

b) All the components shall be checked for critical dimensions in conformance with the relevant figures in Part 4.

c) When head is re-assembled with handle assembly, it shall be possible to insert handle axle by using a soft hammer/mallet.

9.4.2 *Handle Assembly*

9.4.2.1 The fitment of the bearing shall be checked to ensure that the outer race of the bearing does not move when mild force is applied on inner race of the bearing and the inner race of the bearing shall rotate freely.

9.4.2.2 When assembled with the pump head, the handle assembly shall be tested for the requirements given in **9.4.1.2**.

9.4.2.3 All the components shall be dismantled and checked for critical dimensions in conformance with the relevant figures in Part 4.

9.4.3 *Cylinder Assembly*

9.4.3.1 The cylinder assemblies shall be checked for leakage in the following manner:

> The cylinder, with the check valve in place, shall be fitted with one length of riser pipe. The assembly shall be filled with water and kept in vertical position for 10 min. There shall be no leakage of water from the check valve or the caps.

9.4.3.2 The valve assemblies shall be checked for the requirement given in **9.4.4**.

9.4.3.3 Two cylinder assemblies shall be dismantled and checked for the following:

a) The brass liner shall be fitted in the cylinder body in such a manner that it does not rotate freely with the application of hand force after flaring.
b) All the components shall be checked for critical dimensions in conformance with the relevant figures in Parts 5 to 7.
c) In addition, the plunger rods shall be checked for straightness and thread-formation.

9.4.3.4 Two cylinder assemblies (other than those selected for dimensional checks) shall be placed fully submerged in water in a barrel of 200 litres capacity. The test shall start only after getting continuous flow of water through the spout. The water shall then be collected in a container for 40 continuous strokes to be completed in one minute and the discharge thus measured shall not be less than the values given in Table 3.

9.4.4 *Valve Assemblies*

9.4.4.1 The check valve/plunger valve/bobbin shall be checked for free movement in the assembly.

9.4.4.2 All the components shall be dismantled and checked for critical dimensions in conformance with the relevant figures in Parts 6 and 7.

9.4.5 *Components*

The critical dimensions of all the components shall be checked for conformance with the relevant figure given in the respective part.

9.4.6 *Criteria for Conformity*

A lot shall be considered conforming to the requirements of the standard, if the batch selected according to **9.3** satisfy the criteria for conformity given in the corresponding part depending on the assembly, sub-assembly or component it is comprised of.

10 GUARANTEE

The pumps and accessories shall be guaranteed for 12 months from the date of installation or 18 months from the date of supply whichever is earlier against poor workmanship/bad material. The life of the rubber components shall, however, be guaranteed for only 6 months from the date of supply.

11 MARKING

11.1 The pump head assembly shall have a name plate incorporating the name and address of the manufacturer, and a serial number correlating it with the production records.

11.2 A code/serial number shall also be punched on the raised portion of the cylinder body, correlating it with the production records.

11.3 The connecting rod shall have steel punch impression indicating manufacturer's identification mark, month and year of manufacture on the 50 mm long hexagonal coupler.

11.4 The following shall be marked on the upper side of bottom flange of water tank in minimum 10 mm size and it shall be legible after galvanizing:

32 — For SDWP and EDWP
50 — For VLOM-50
65 — For VLOM-65

11.5 All individual components shall bear the manufacturers' identification mark as specified in **11.5.1**. The location of the marking will be so selected that it does not interfere with the performance/functioning of the component.

11.5.1 The head flange, handle, third plate, cone plate, water tank top flange, cover plate and stand flange shall have steel punch impression of the identification mark punched before galvanizing. The impression shall be deep enough so that they shall not be covered under galvanizing.

11.5.2 The stainless steel components shall have steel punch impression of the identification mark.

11.5.3 The cast iron components shall have the mark in raised letters. In addition, the cylinder body shall also bear year of manufacture marked in the same manner.

11.5.4 The bronze components shall have the mark in raised letter or steel punched.

11.5.5 The rubber components shall have the mark embossed during moulding, except that:

a) The components where embossing is not practical, the marking shall be done with waterproof ink printing; and
b) For O-rings, the marking shall be done on the packing.

11.6 BIS Certification Marking

11.6.1 The handpumps, individual components and special tools may also be marked with the Standard Mark.

11.6.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of the conditions under which the license for the use of the Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PACKING

12.1 Unless otherwise specified in the contract or order, the packing procedure mentioned in Annex C shall be followed.

12.2 External threads of all the threaded components shall be fitted with suitable thread protectors to avoid transit damage.

12.3 Riser pipe shall be packed as per procedure laid down in IS 4740, unless otherwise specified by the purchaser.

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 2 HANDPUMPS

1 SCOPE

1.1 This part specifies the requirements of complete assembly of each type of handpumps (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 The handpump assemblies covered in this part shall be exclusive of riser pipes.

1.3 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the products covered in this part, shall apply.

2 CONSTRUCTION

2.1 The assembly detail of different types of handpumps covered in this part shall be as given in Fig. 2.1 to 2.4.

2.2 The assembly detail of individual sub-assembly shall be as given in the related figure in Part 3.

2.3 The material and dimensions of the individual component shall meet the requirements given in the related part of this standard

3 TESTING

3.1 Group of each type of handpump covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 Sub-assemblies and other components of the handpumps selected as per **3.2** shall be tested as given below.

3.3.1 *Head and Cylinder Assemblies*

The head and cylinder assemblies shall be checked as per the detail given in **9.4.1** and **9.4.3** respectively of Part 1.

3.3.2 *Other Components*

All other steel and rubber components of the pump assembly not covered under **3.3.1** shall be checked for the tests given in **3** of Part 4 and also in **3** of Part 7 respectively.

3.4 Criteria for Conformity

3.4.1 The lot of the pumps shall be considered conforming to the requirements of the standard, if the batch selected according to **3.2** satisfies the requirements given in **3.4.2**.

3.4.2 The number of samples not meeting the requirements of a characteristic, inspected under **3.3.1** and **3.3.2**, does not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

4 MARKING

The requirements given in **11** of Part 1 shall apply.

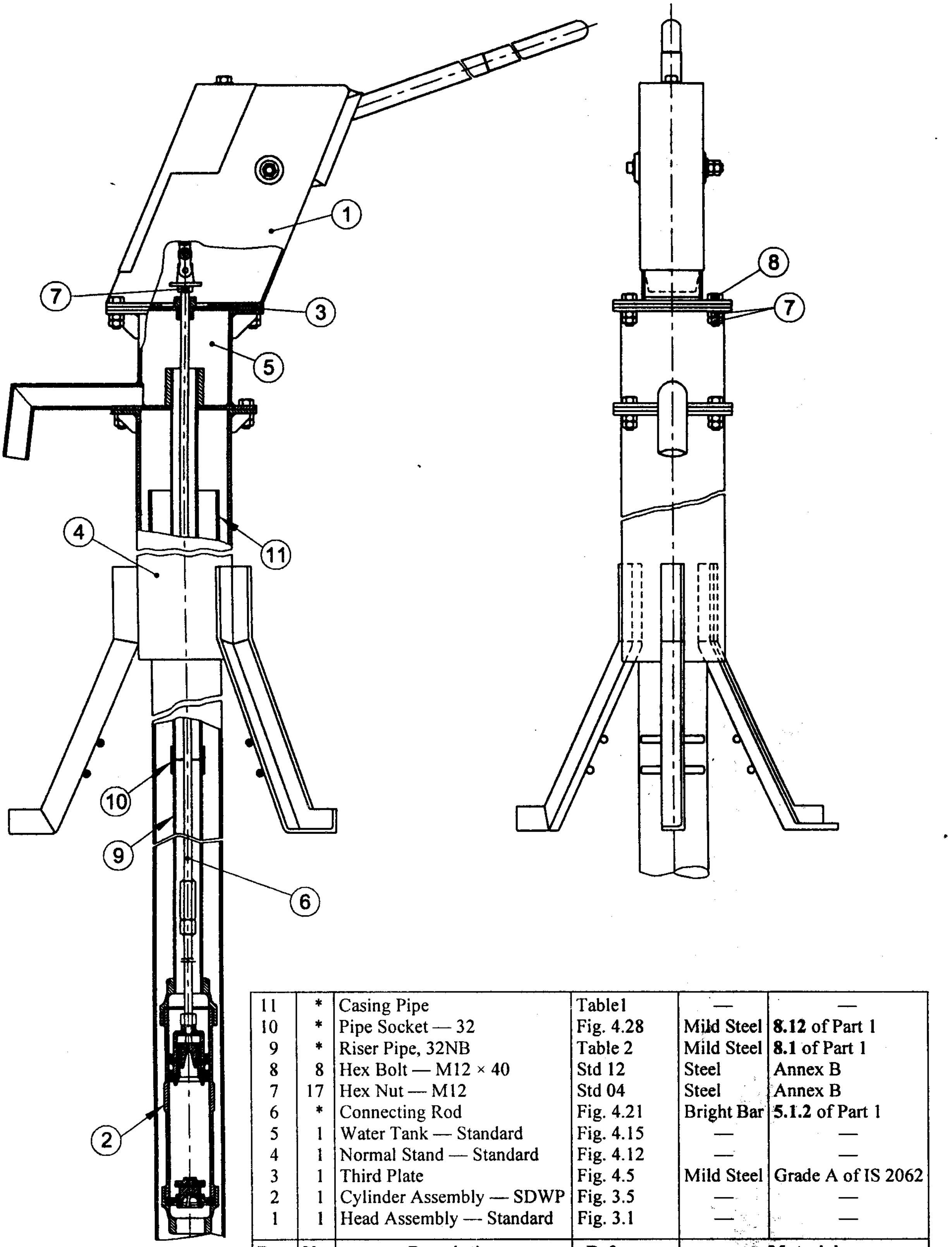
5 PACKING

5.1 In addition to the requirements given in **12.1** and **12.2** of Part 1, the following conditions shall apply for the head assembly.

5.1.1 Handle shall be locked in position with some suitable arrangement before packing the head assembly.

5.1.2 An extra hexagonal nut (Std 04 in Annex B) shall be attached to chain for use of locking the last connecting rod with chain coupling.

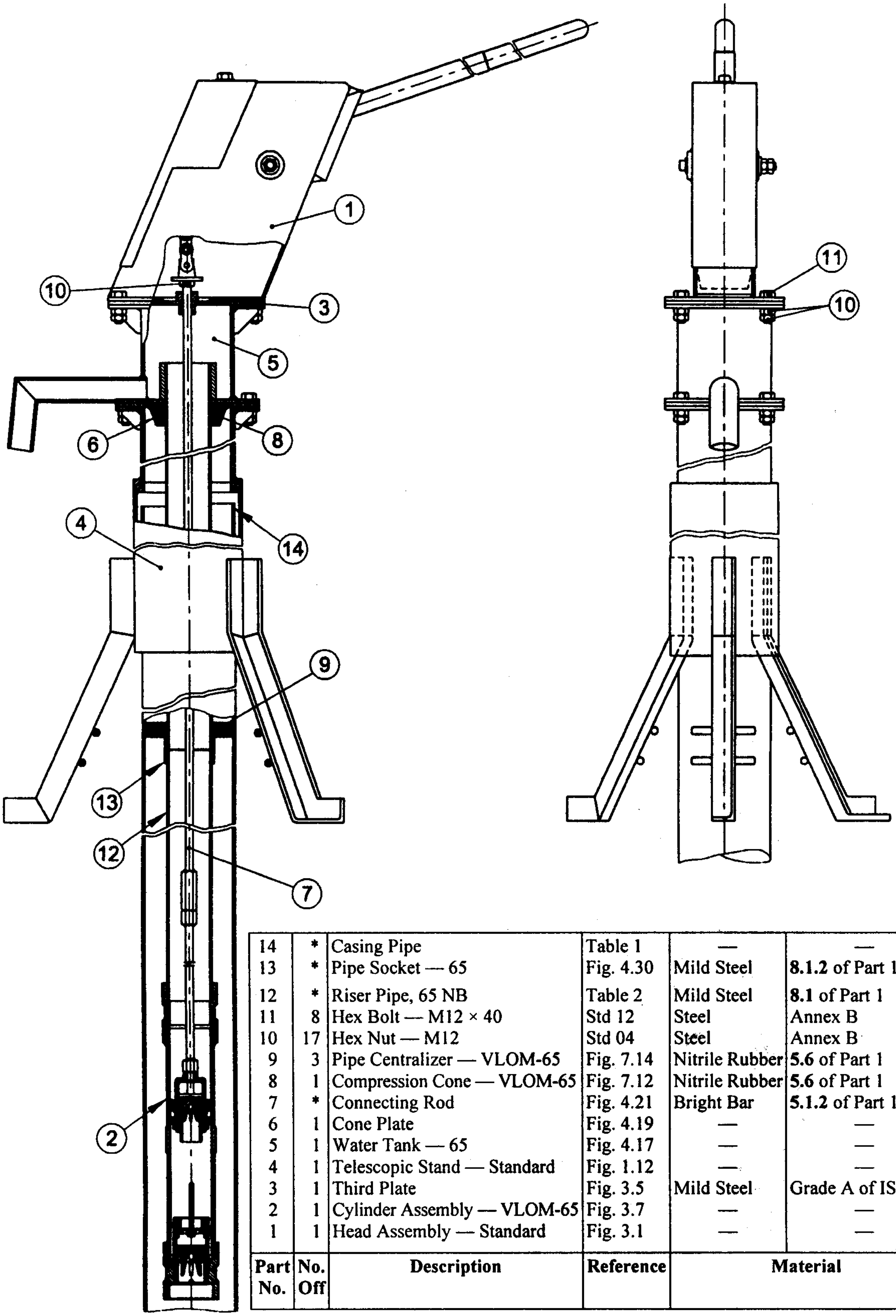
5.1.3 The chain shall be smeared with graphite grease and covered with a polyethylene bag prior to dispatch.



Part No.	No. Off	Description	Reference	Material	
11	*	Casing Pipe	Table1	—	—
10	*	Pipe Socket — 32	Fig. 4.28	Mild Steel	**8.12** of Part 1
9	*	Riser Pipe, 32NB	Table 2	Mild Steel	**8.1** of Part 1
8	8	Hex Bolt — M12 × 40	Std 12	Steel	Annex B
7	17	Hex Nut — M12	Std 04	Steel	Annex B
6	*	Connecting Rod	Fig. 4.21	Bright Bar	**5.1.2** of Part 1
5	1	Water Tank — Standard	Fig. 4.15	—	—
4	1	Normal Stand — Standard	Fig. 4.12	—	—
3	1	Third Plate	Fig. 4.5	Mild Steel	Grade A of IS 2062
2	1	Cylinder Assembly — SDWP	Fig. 3.5	—	—
1	1	Head Assembly — Standard	Fig. 3.1	—	—

* Depending on the field conditions/pump settings.

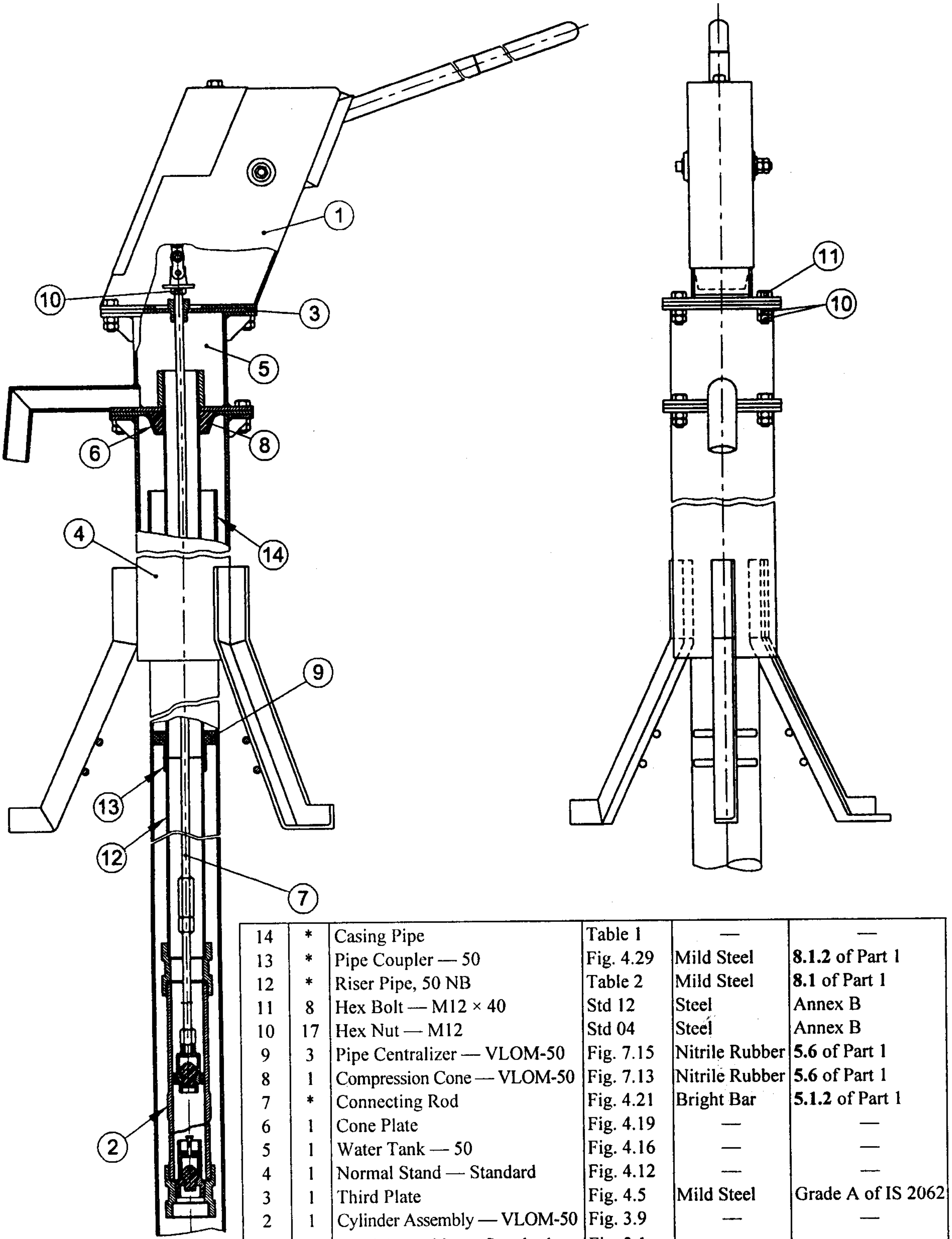
FIG. 2.1 DEEPWELL HANDPUMP — STANDARD (SDWP)



Part No.	No. Off	Description	Reference	Material	
14	*	Casing Pipe	Table 1	—	—
13	*	Pipe Socket — 65	Fig. 4.30	Mild Steel	**8.1.2** of Part 1
12	*	Riser Pipe, 65 NB	Table 2	Mild Steel	**8.1** of Part 1
11	8	Hex Bolt — M12 × 40	Std 12	Steel	Annex B
10	17	Hex Nut — M12	Std 04	Steel	Annex B
9	3	Pipe Centralizer — VLOM-65	Fig. 7.14	Nitrile Rubber	**5.6** of Part 1
8	1	Compression Cone — VLOM-65	Fig. 7.12	Nitrile Rubber	**5.6** of Part 1
7	*	Connecting Rod	Fig. 4.21	Bright Bar	**5.1.2** of Part 1
6	1	Cone Plate	Fig. 4.19	—	—
5	1	Water Tank — 65	Fig. 4.17	—	—
4	1	Telescopic Stand — Standard	Fig. 1.12	—	—
3	1	Third Plate	Fig. 3.5	Mild Steel	Grade A of IS 2062
2	1	Cylinder Assembly — VLOM-65	Fig. 3.7	—	—
1	1	Head Assembly — Standard	Fig. 3.1	—	—

* Depending on the field conditions/pump settings.

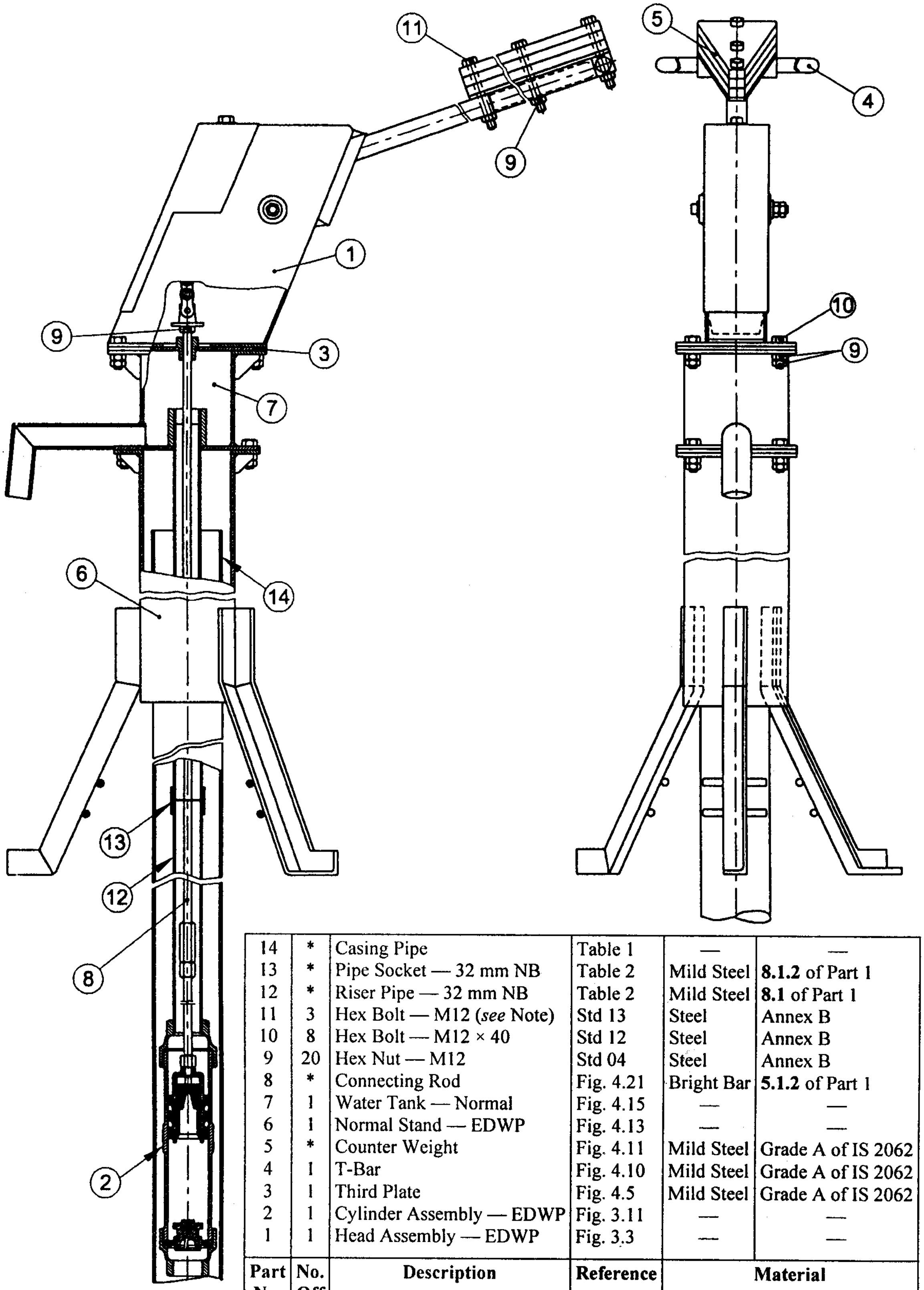
FIG. 2.2 DEEPWELL HANDPUMP — VLOM-65



Part No.	No. Off	Description	Reference	Material	
14	*	Casing Pipe	Table 1	—	—
13	*	Pipe Coupler — 50	Fig. 4.29	Mild Steel	**8.1.2** of Part 1
12	*	Riser Pipe, 50 NB	Table 2	Mild Steel	**8.1** of Part 1
11	8	Hex Bolt — M12 × 40	Std 12	Steel	Annex B
10	17	Hex Nut — M12	Std 04	Steel	Annex B
9	3	Pipe Centralizer — VLOM-50	Fig. 7.15	Nitrile Rubber	**5.6** of Part 1
8	1	Compression Cone — VLOM-50	Fig. 7.13	Nitrile Rubber	**5.6** of Part 1
7	*	Connecting Rod	Fig. 4.21	Bright Bar	**5.1.2** of Part 1
6	1	Cone Plate	Fig. 4.19	—	—
5	1	Water Tank — 50	Fig. 4.16	—	—
4	1	Normal Stand — Standard	Fig. 4.12	—	—
3	1	Third Plate	Fig. 4.5	Mild Steel	Grade A of IS 2062
2	1	Cylinder Assembly — VLOM-50	Fig. 3.9	—	—
1	1	Head Assembly — Standard	Fig. 3.1	—	—

* Depending on field conditions/pump settings.

FIG. 2.3 DEEPWELL HANDPUMP — VLOM-50



Part No.	No. Off	Description	Reference	Material	
14	*	Casing Pipe	Table 1	—	—
13	*	Pipe Socket — 32 mm NB	Table 2	Mild Steel	**8.1.2** of Part 1
12	*	Riser Pipe — 32 mm NB	Table 2	Mild Steel	**8.1** of Part 1
11	3	Hex Bolt — M12 (*see* Note)	Std 13	Steel	Annex B
10	8	Hex Bolt — M12 × 40	Std 12	Steel	Annex B
9	20	Hex Nut — M12	Std 04	Steel	Annex B
8	*	Connecting Rod	Fig. 4.21	Bright Bar	**5.1.2** of Part 1
7	1	Water Tank — Normal	Fig. 4.15	—	—
6	1	Normal Stand — EDWP	Fig. 4.13	—	—
5	*	Counter Weight	Fig. 4.11	Mild Steel	Grade A of IS 2062
4	1	T-Bar	Fig. 4.10	Mild Steel	Grade A of IS 2062
3	1	Third Plate	Fig. 4.5	Mild Steel	Grade A of IS 2062
2	1	Cylinder Assembly — EDWP	Fig. 3.11	—	—
1	1	Head Assembly — EDWP	Fig. 3.3	—	—

* Depending on field conditions/pump settings.

NOTE — In case of item 11, the bolt length will depend upon the number of counter weight.

FIG. 2.4 DEEPWELL HANDPUMP — EXTRA DEEP (EDWP)

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 3 HANDPUMP SUB-ASSEMBLIES

1 SCOPE

1.1 This part specifies the requirements of individual sub-assemblies used to assemble each type of hand pump (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the components covered in this part, shall apply.

2 CONSTRUCTION

2.1 The assembly details of different handpump sub-assemblies covered in this part shall be as given in Fig. 3.1 to 3.12.

2.2 The material and dimensions of the individual component shall meet the requirements given in the related part of this standard.

3 TESTING

3.1 Group of each type of sub-assembly covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 Depending on the type of sub-assembly, the samples drawn as per **3.2** shall be tested as given below.

3.3.1 *Head Assembly*

The head assembly shall be examined as per the detail given in **9.4.1** of Part 1.

3.3.2 *Handle Assembly*

The handle assembly shall be examined as per the detail given in **9.4.2** of Part 1.

3.3.3 *Cylinder Assembly*

The cylinder assembly shall be subjected to tests detailed in **9.4.3** of Part 1.

3.3.4 *Valve Assemblies*

The valve assembly shall be checked for the requirements provided in **9.4.4** of Part 1.

3.4 Criteria for Conformity

3.4.1 The lot shall be considered conforming to the requirements of the standard, if the batch selected according to **3.2** satisfy the requirements given in **3.4.2**.

3.4.2 The number of samples not meeting the requirements of the characteristics inspected under the corresponding clause(s) of Part 1 as given in Table 4, does not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

Table 4

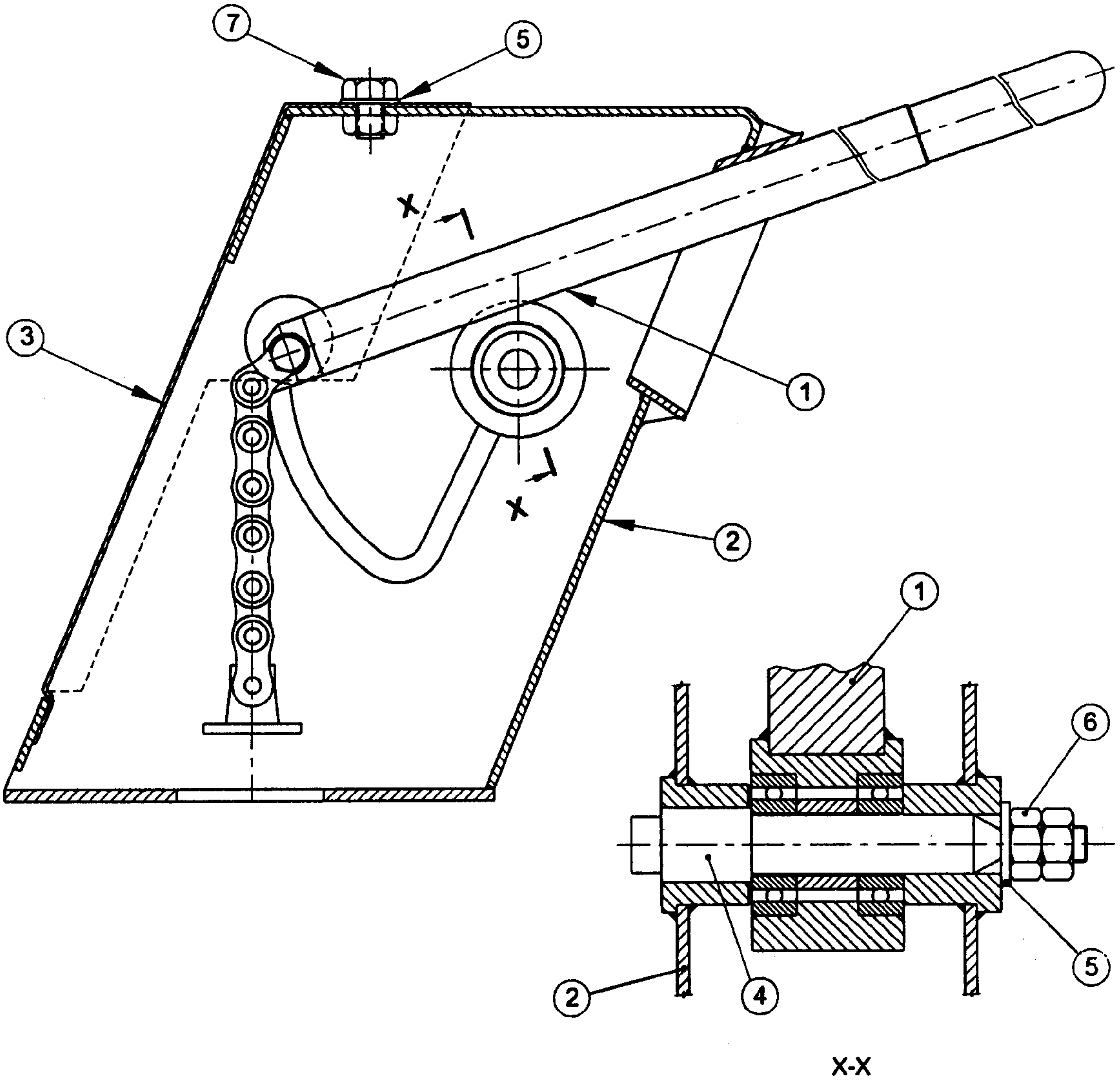
Sl No. (1)	Lot Type (2)	Ref to Cl of Part 1 (3)
i)	Head Assembly	9.4.1
ii)	Handle Assembly	9.4.2
iii)	Cylinder Assembly	9.4.3
iv)	Valve Assembly	9.4.4

4 MARKING

The requirements given in **11** of Part 1 shall apply.

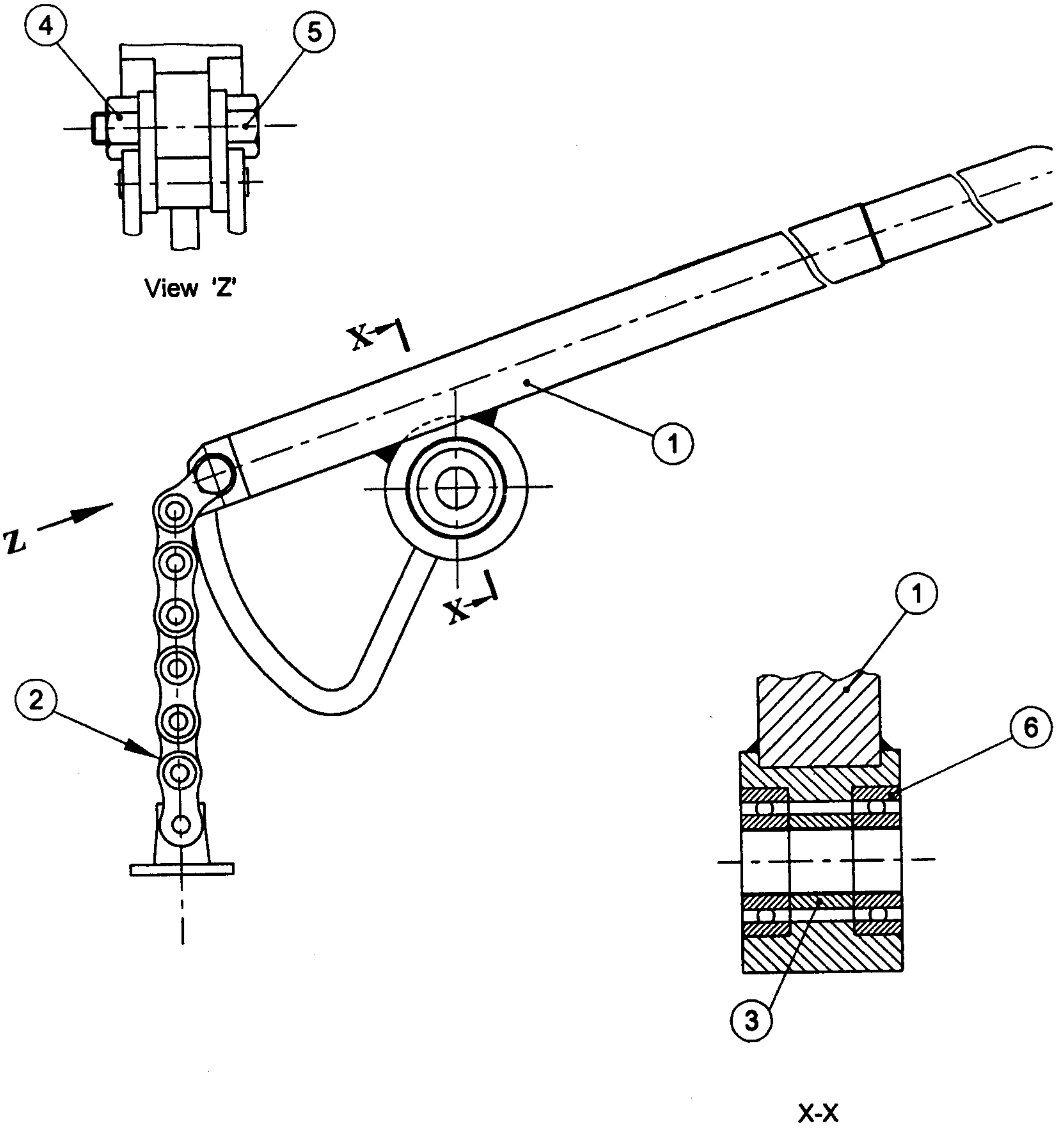
5 PACKING

In addition to the requirements given in **12.1** and **12.2** of Part 1, the conditions specific to the head assembly given in **5.1.1** to **5.1.3** of Part 2 shall be applicable.



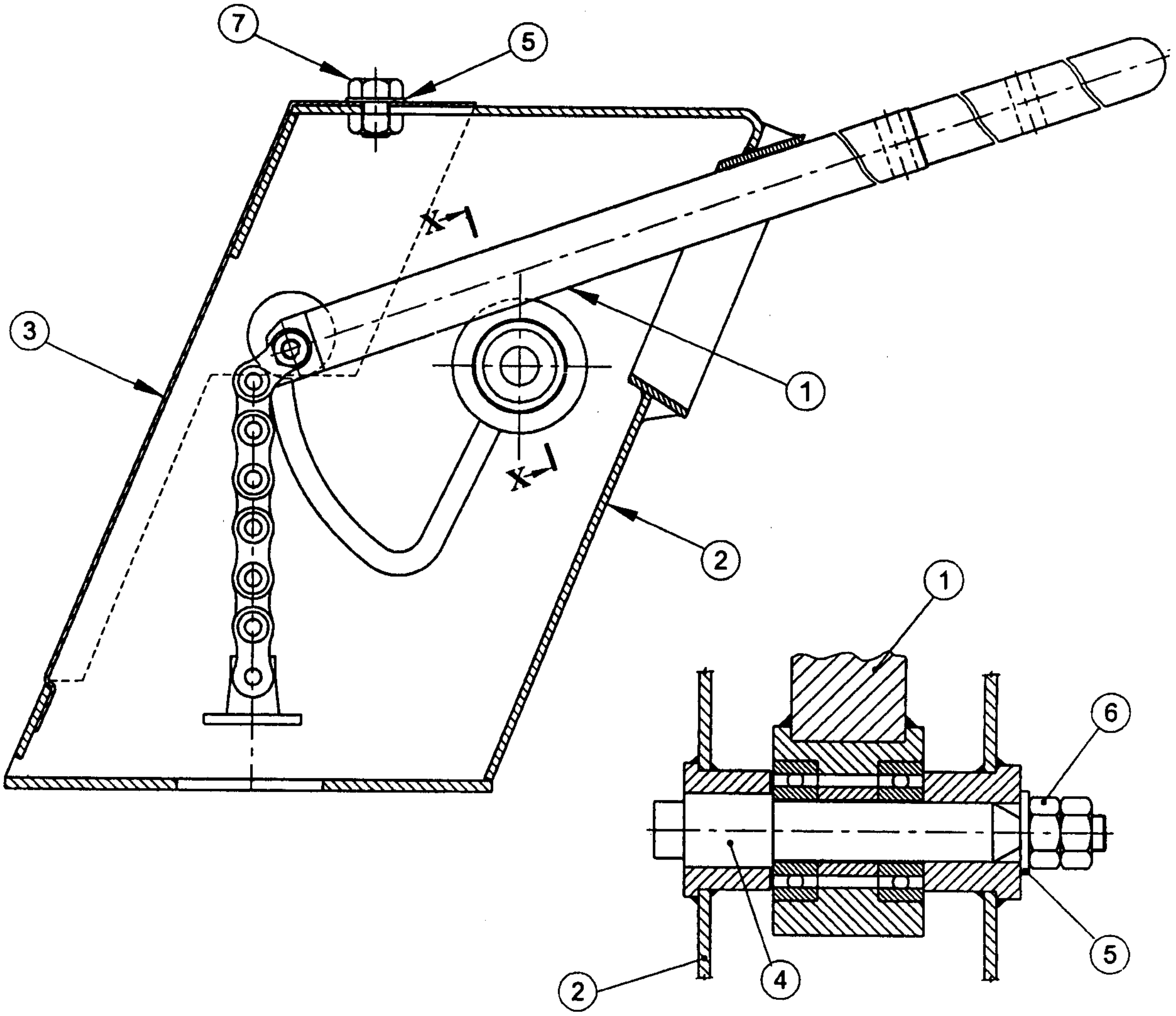
Part No.	No. Off	Description	Reference	Material	
7	1	Hexagonal Bolt — M12 × 20	Std 10	Steel	Annex B
6	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
5	1	Washer	Fig. 4.27	Mild Steel	Grade A of IS 2062
4	1	Handle Axle	Fig. 4.24	Stainless Steel	**5.2** of Part 1
3	1	Front Cover	Fig. 4.4	CRS Sheet	Ord. Grade of IS 513
2	1	Head — Standard	Fig. 4.1	—	—
1	1	Handle Assembly — Standard	Fig. 3.2	—	—

FIG. 3.1 HEAD ASSEMBLY STANDARD
(For SDWP, VLOM-65 and VLOM-50)



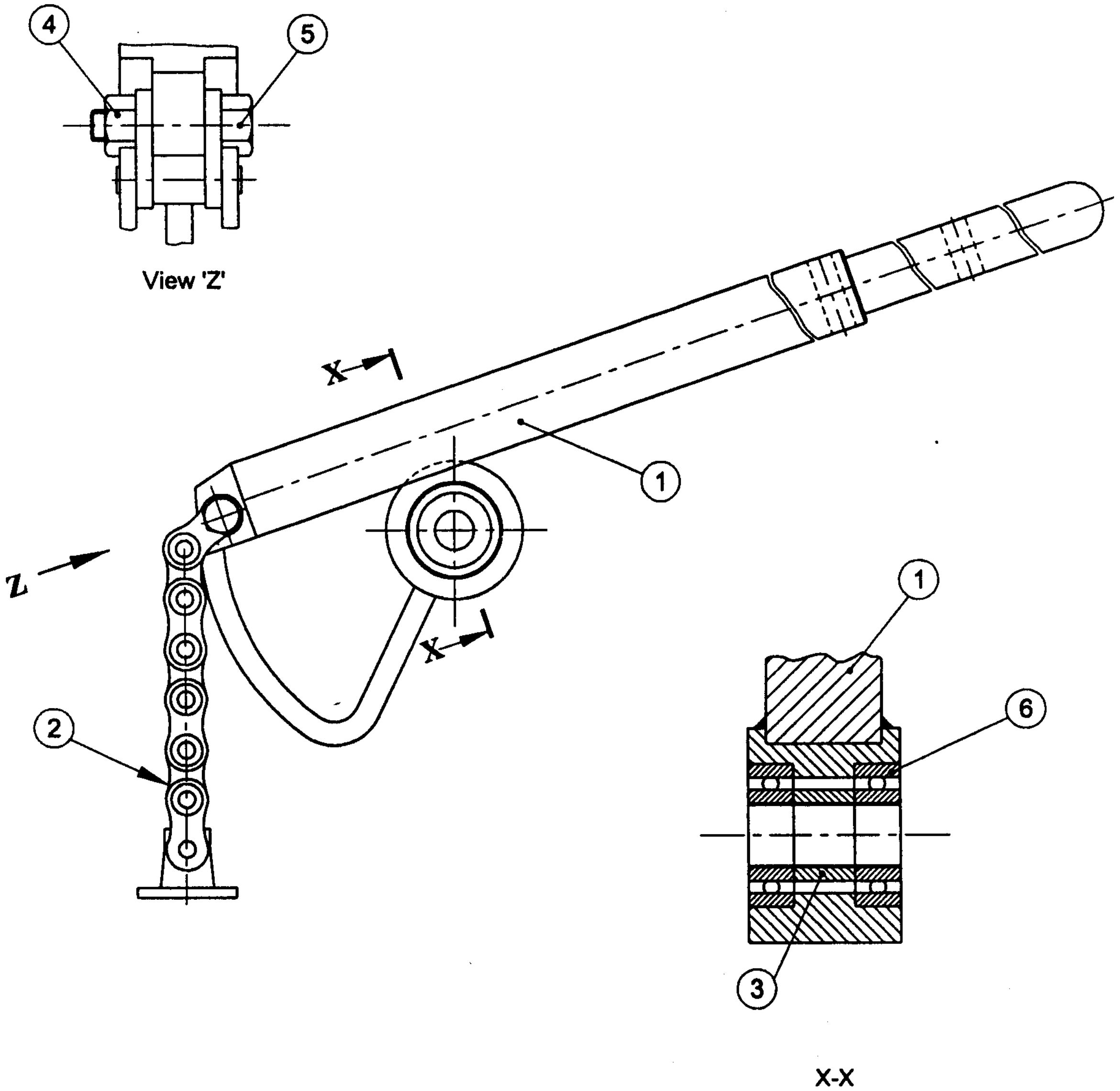
6	2	Bearing, Single Side Shielded	Std 15	Designation 20 BC 02 PP of IS 6455	
5	1	Hex. Bolt — M10 × 40 (Gr 8.8)	Std 09	HT Bold	Annex B
4	1	Prevailing Torque Type Hex. Nut, M10	Std 03	Steel	Annex B
3	1	Bearing Spacer	Fig. 4.26	Mild Steel	Grade A of IS 2062
2	1	Chain with Coupling	Fig. 4.9	—	—
1	1	Handle — Standard	Fig. 4.6	—	—
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

Fig. 3.2 Handle Assembly — Standard
(For SDWP, VLOM-65 and VLOM-50)



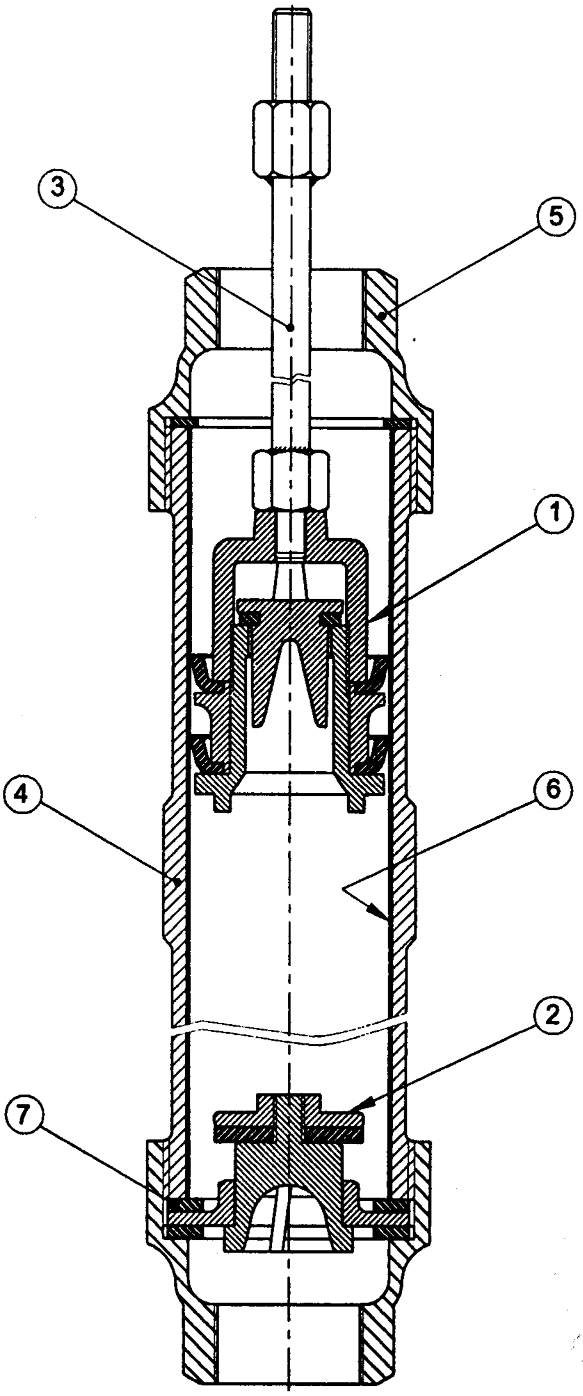
Part No.	No. Off	Description	Reference	Material	
7	1	Hexagonal Bolt — M12 × 20	Std 10	Steel	Annex B
6	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
5	1	Washer	Fig. 4.27	Mild Steel	Grade A of IS 2062
4	1	Handle Axle	Fig. 4.24	Stainless Steel	**5.2** of Part 1
3	1	Front Cover	Fig. 4.4	CRS Sheet	Ord. Grade of IS 513
2	1	Head — EDWP	Fig. 4.2	—	—
1	1	Handle Assembly — EDWP	Fig. 3.4	—	—

FIG. 3.3 HEAD ASSEMBLY — EDWP



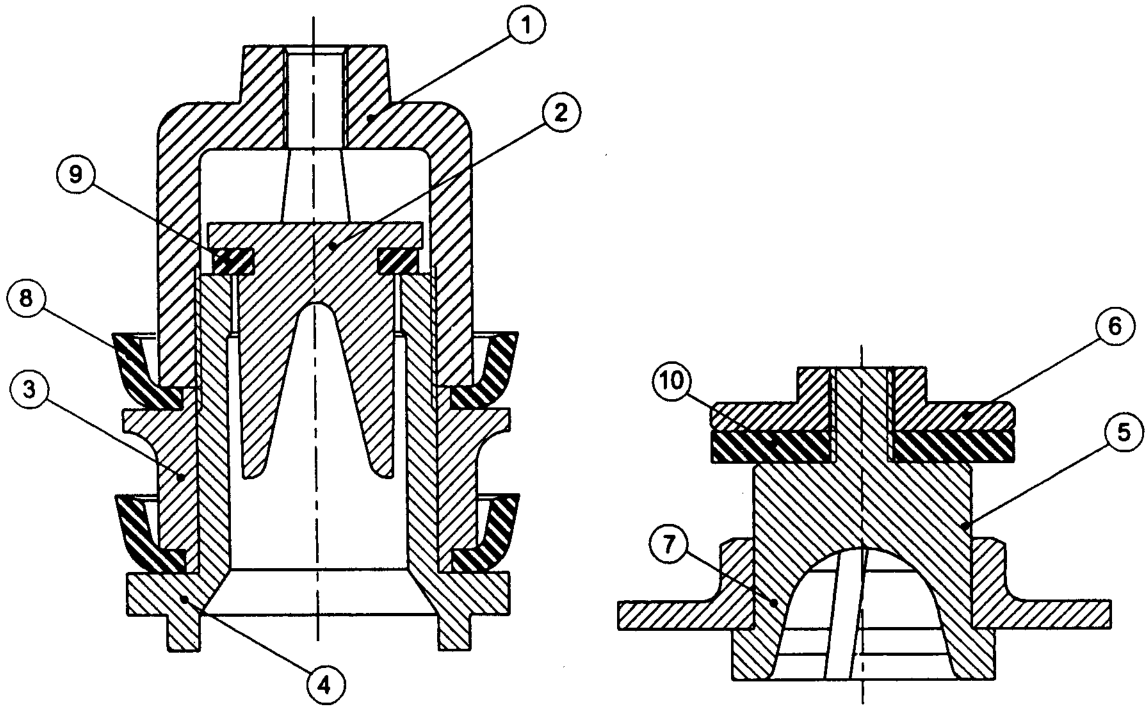
6	2	Bearing, Single Side Shielded	Std 15	Designation 20 BC 02 PP of IS 6455	
5	1	Hex. Bolt — M10 × 40 (8.8)	Std 09	HT Bolt	Annex B
4	1	Prevailing Torque Type Hex. Nut, M10	Std 03	Steel	Annex B
3	1	Bearing Spacer	Fig. 4.26	Mild Steel	Grade A of IS 2062
2	1	Chain with Coupling	Fig. 4.9	—	—
1	1	Handle — EDWP	Fig. 4.7	—	—
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

FIG. 3.4 HANDLE ASSEMBLY — EDWP



7	3	Sealing Ring — Standard	Fig. 7.3	Nitrile Rubber	**5.6** of Part 1
6	1	Brass Line — Standard	Fig. 6.1A	Brass Tube	CuZn30 As of IS 407
5	2	Reducer Cap	Fig. 5.4	Cast Iron	FG 200 of IS 210
4	1	Cylinder Body — Standard	Fig. 5.1	Cast Iron	FG 200 of IS 210
3	1	Plunger Rod — Standard	Fig. 4.22	Stainless Steel	04Cr18Ni10 of IS 6603
2	1	Check Valve Assembly — Standard	Fig. 3.6B	—	—
1	1	Plunger Valve Assembly — Standard	Fig. 3.6A	—	—
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

FIG. 3.5 CYLINDER ASSEMBLY — SDWP



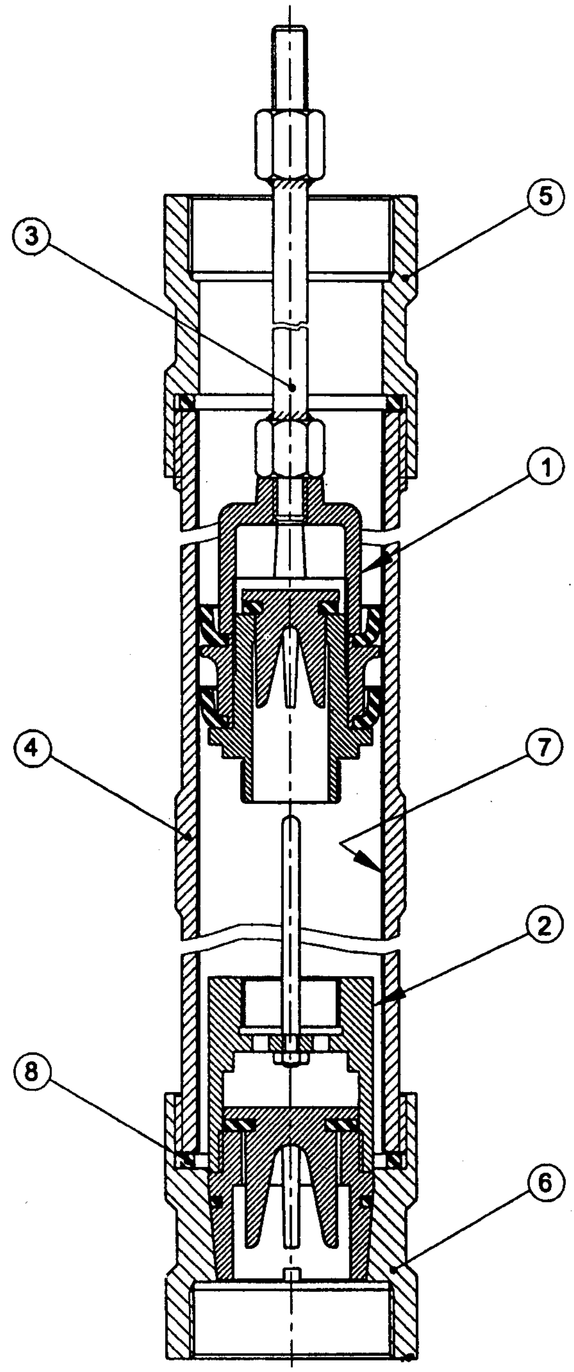
3.6A Plunger Valve Assembly — SWDP

3.6B Check Valve Assembly — SDWP

10	1	Check Valve Seating — Standard	Fig. 7.7	Nitrile Rubber	**5.6** of Part 1
9	1	Upper Valve Seating	Fig. 7.6	Nitrile Rubber	**5.6** of Part 1
8	2	Pump Bucket — Standard	Fig. 7.1	Nitrile Rubber	**5.6** of Part 1
7	1	Check Valve Seat — Standard	Fig. 6.12	Bronze	Grade LTB2 of IS 318
6	1	Rubber Seat Retainer	Fig. 6.11	Bronze	Grade LTB2 of IS 318
5	1	Check Valve — Standard	Fig. 6.9	Bronze	Grade LTB2 of IS 318
4	1	Follower — SDWP	Fig. 6.6	Bronze	Grade LTB2 of IS 318
3	1	Bucket Spacer — Standard	Fig. 6.4	Bronze	Grade LTB2 of IS 318
2	1	Upper Valve	Fig. 6.3	Bronze	Grade LTB2 of IS 318
1	1	Plunger Yoke Body	Fig. 6.2	Bronze	Grade LTB2 of IS 318
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

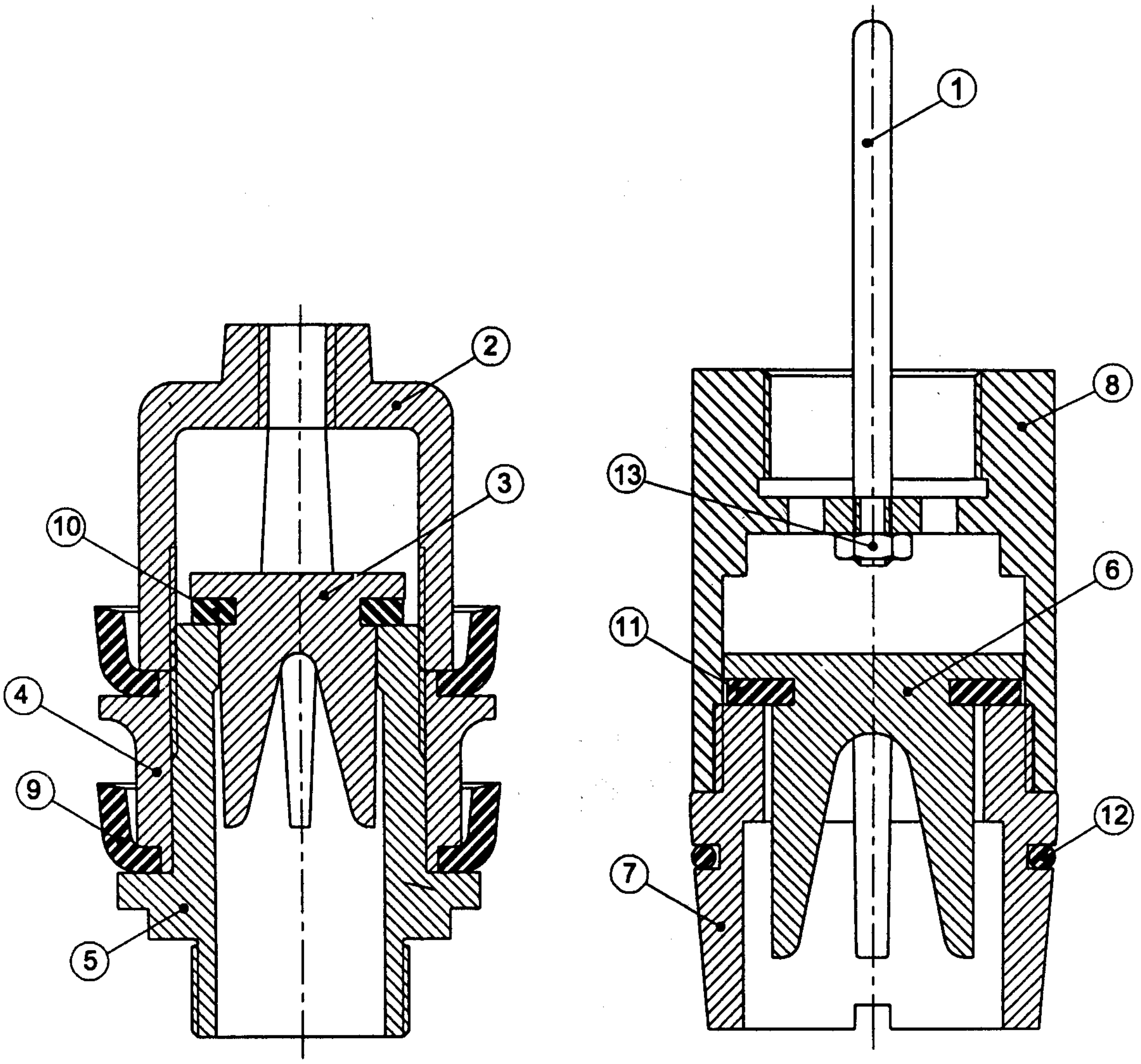
NOTE — Check valve assembly to be punch locked on top at M10 joint at diametrically opposite two points after filing the two surfaces even.

FIG. 3.6 VALVE ASSEMBLIES — SDWP



8	2	Sealing Ring — VLOM-65	Fig. 7.4	Nitrile Rubber	5.6 of Part 1
7	1	Brass Liner — Long	Fig. 6.1B	Brass Tube	CuZn30 As of IS 407
6	1	Bottom Cap — VLOM-65	Fig. 5.5B	Cast Iron	FG 200 of IS 210
5	1	Upper Cap — VLOM-65	Fig. 5.5A	Cast Iron	FG 200 of IS 210
4	1	Cylinder Body — Long	Fig. 5.2	Cast Iron	FG 200 of IS 210
3	1	Plunger Rod — Long	Fig. 4.23	Stainless Steel	04Cr18Ni10 of IS 6603
2	1	Check Valve Assembly — VLOM-65	Fig. 3.8B	—	—
1	1	Plunger Valve Assembly — VLOM-65	Fig. 3.8A	—	—
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

FIG. 3.7 CYLINDER ASSEMBLY — VLOM-65

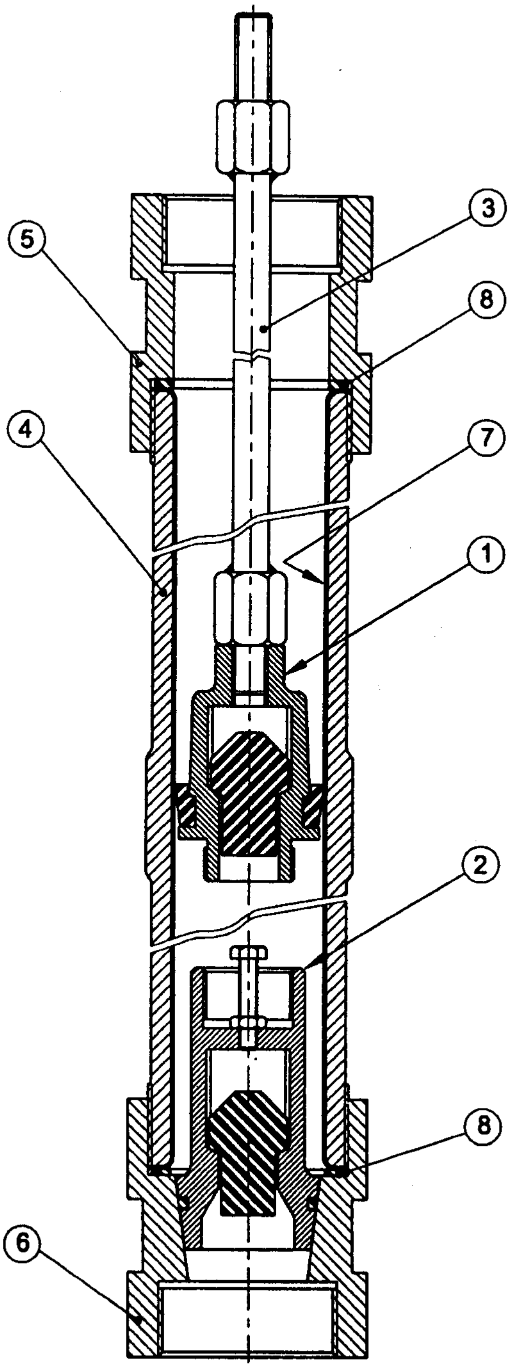


3.8A Plunger Valve Assembly — VLOM-65

3.8B Check Valve Assembly — VLOM-65

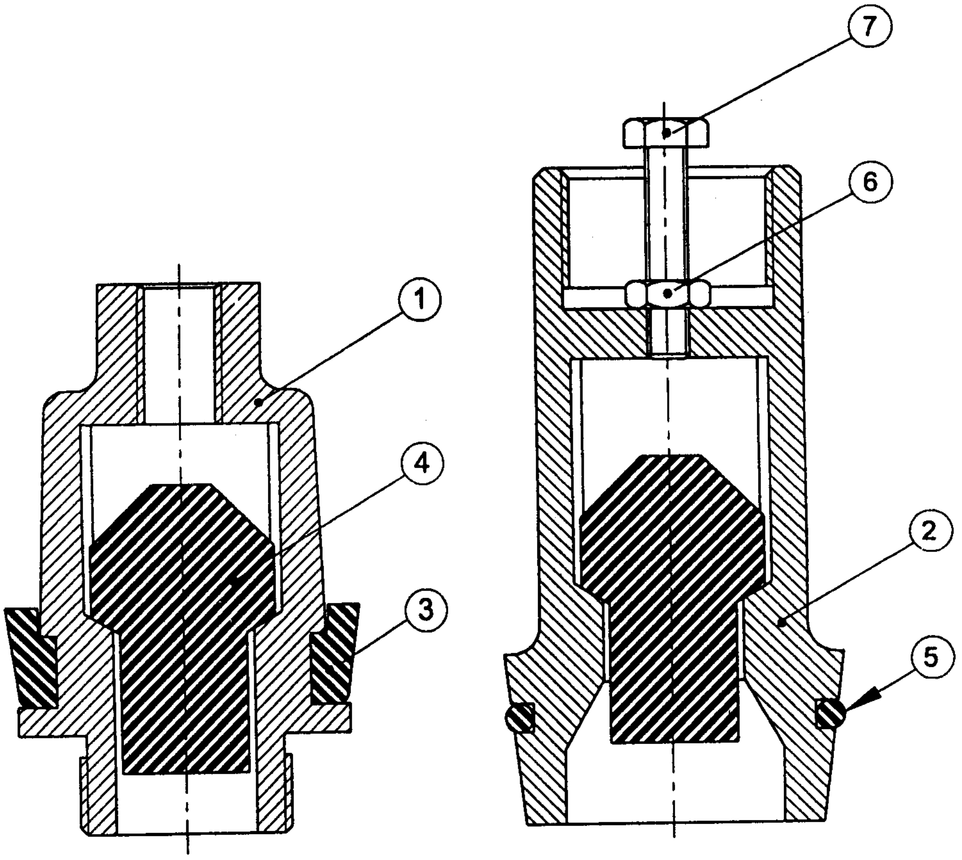
Part No.	No. Off	Description	Reference	Material	
13	1	Check Nut — M6	Std 01	Stainless Steel	Annex B
12	1	O-Ring — VLOM-65	Fig. 7.10	Nitrile Rubber	5.6 of Part 1
11	1	Check Valve Seating — VLOM-65	Fig. 7.8	Nitrile Rubber	5.6 of Part 1
10	1	Upper Valve Seating	Fig. 7.6	Nitrile Rubber	5.6 of Part 1
9	2	Pump Bucket — Standard	Fig. 7.1	Nitrile Rubber	5.6 of Part 1
8	1	Cage	Fig. 6.14	Bronze	Grade LTB2 of IS 318
7	1	Check Valve Seat — VLOM-65	Fig. 6.13	Bronze	Grade LTB2 of IS 318
6	1	Check Valve — VLOM-65	Fig. 6.10	Bronze	Grade LTB2 of IS 318
5	1	Follower — VLOM-65	Fig. 6.8	Bronze	Grade LTB2 of IS 318
4	1	Bucket Spacer — Standard	Fig. 6.4	Bronze	Grade LTB2 of IS 318
3	1	Upper Valve	Fig. 6.3	Bronze	Grade LTB2 of IS 318
2	1	Plunger Yoke Body	Fig. 6.2	Bronze	Grade LTB2 of IS 318
1	1	Push Rod	Fig. 6.25	Stainless Steel	5.2.2 of Part 1

FIG. 3.8 VALVE ASSEMBLIES — VLOM-65



8	2	Sealing Ring — VLOM-50	Fig. 7.5	Nitrile Rubber	**5.6** of Part 1
7	1	Brass Liner — VLOM-50	Fig. 6.1C	Brass Tube	CuZn30 As of IS 407
6	1	Bottom Cap — VLOM-50	Fig. 5.6B	Cast Iron	FG 200 of IS 210
5	1	Upper Cap — VLOM-50	Fig. 5.6A	Cast Iron	FG 200 of IS 210
4	1	Cylinder Body — VLOM-50	Fig. 5.3	Cast Iron	FG 200 of IS 210
3	1	Plunger Rod — Long	Fig. 4.23	Stainless Steel	04Cr18Ni10 of IS 6603
2	1	Check Valve Assembly — VLOM-50	Fig. 3.10B	—	—
1	1	Plunger Valve Assembly — VLOM-50	Fig. 3.10A	—	—
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

FIG. 3.9 CYLINDER ASSEMBLY — VLOM-50

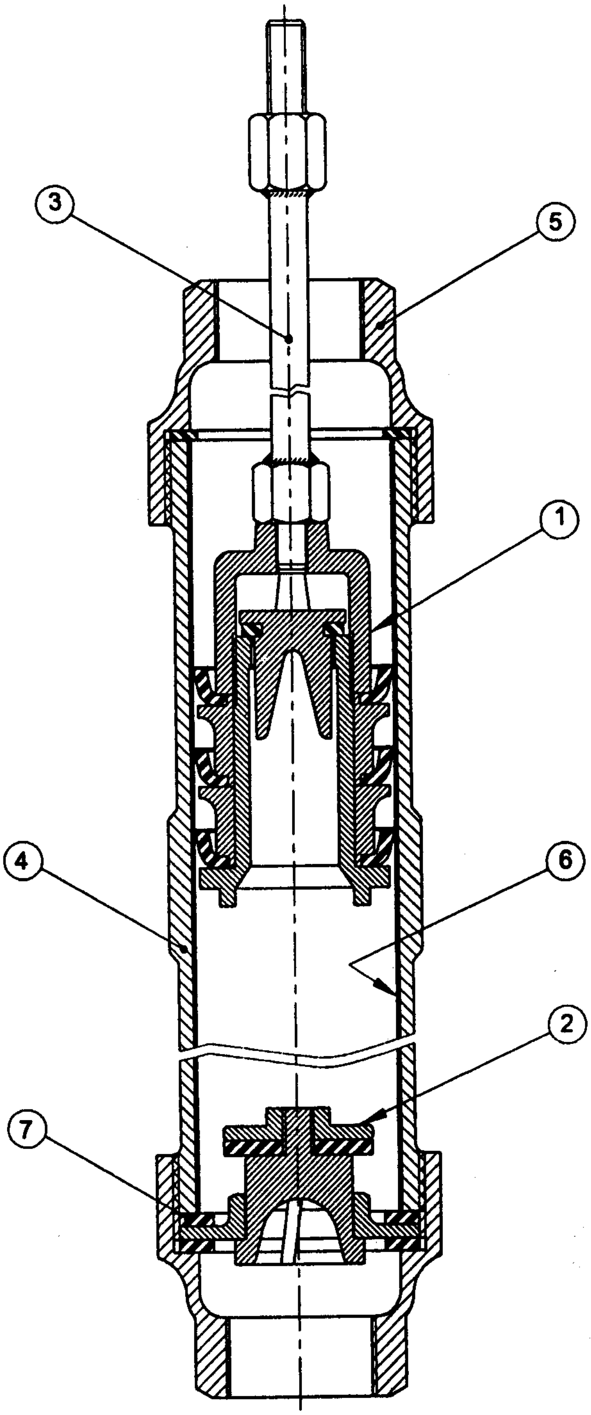


3.10A Plunger Valve Assembly — VLOM-50

3.10B Check Valve Assembly — VLOM-50

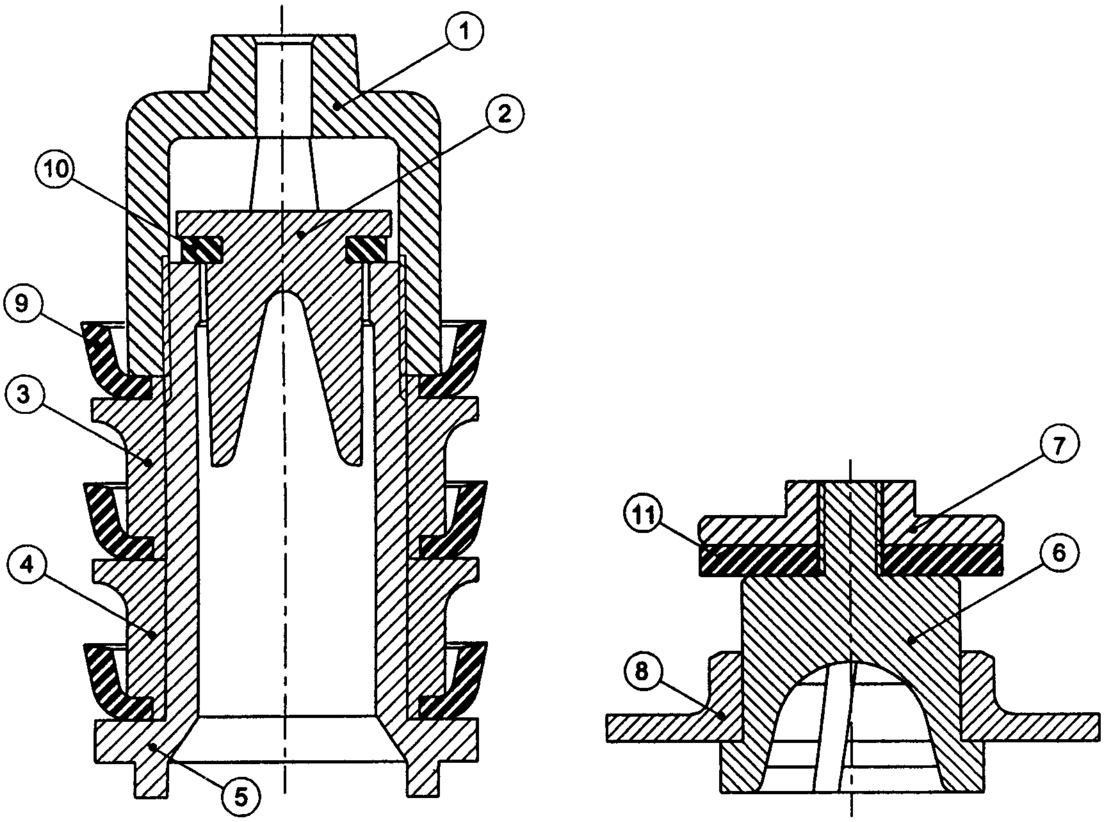
Part No.	No. Off	Description	Reference	Material	
7	1	Hexagonal Bolt — M6 × 25	Std 05	Stainless Steel	Annex B
6	1	Hexagonal Nut — M6	Std 01	Stainless Steel	Annex B
5	1	O-Ring — VLOM-50	Fig. 7.11	Nitrile Rubber	**5.6** of Part 1
4	2	Bobbin	Fig. 7.9	Nitrile Rubber	**5.6** of Part 1
3	1	Pump Bucket — VLOM-50	Fig. 7.2	Nitrile Rubber	**5.6** of Part 1
2	1	Check Valve Body	Fig. 6.16	Bronze	Grade LTB2 of IS 318
1	1	Plunger Valve Body	Fig. 6.15	Bronze	Grade LTB2 of IS 318

FIG. 3.10 VALVE ASSEMBLIES — VLOM-50



Part No.	No. Off	Description	Reference	Material	
7	3	Sealing Ring — Standard	Fig. 7.3	Nitrile Rubber	**5.6** of Part 1
6	1	Brass Liner — Long	Fig. 6.1B	Brass Tube	CuZn30 As of IS 407
5	2	Reducer Cap	Fig. 5.4	Cast Iron	FG 200 of IS 210
4	1	Cylinder Body — Long	Fig. 5.2	Cast Iron	FG 200 of IS 210
3	1	Plunger Rod — Long	Fig. 4.23	Stainless Steel	04Cr18Ni10 of IS 6603
2	1	Check Valve Assembly — EDWP	Fig. 3.12B	—	—
1	1	Plunger Valve Assembly — EDWP	Fig. 3.12A	—	—

FIG. 3.11 CYLINDER ASSEMBLY — EDWP



3.12A Plunger Valve Assembly — EDWP

3.12B Check Valve Assembly — EDWP

11	1	Lower Valve Seating — Standard	Fig. 7.7	Nitrile Rubber	**5.6** of Part 1
10	1	Upper Valve Seating	Fig. 7.6	Nitrile Rubber	**5.6** of Part 1
9	3	Pump Bucket — Standard	Fig. 7.1	Nitrile Rubber	**5.6** of Part 1
8	1	Check Valve Seat — Standard	Fig. 6.13	Bronze	Grade LTB2 of IS 318
7	1	Rubber Seat Retainer	Fig. 6.11	Bronze	Grade LTB2 of IS 318
6	1	Check Valve — Standard	Fig. 6.9	Bronze	Grade LTB2 of IS 318
5	1	Follower — EDWP	Fig. 6.7	Bronze	Grade LTB2 of IS 318
4	1	Bucket Spacer — Lower	Fig. 6.5	Bronze	Grade LTB2 of IS 318
3	1	Bucket Spacer — Standard	Fig. 6.4	Bronze	Grade LTB2 of IS 318
2	1	Upper Valve	Fig. 6.3	Bronze	Grade LTB2 of IS 318
1	1	Plunger Yoke Body	Fig. 6.2	Bronze	Grade LTB2 of IS 318
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTE — Lower valve assembly to be punch locked on top at M10 joint at diametrically opposite two points after filing the two surfaces even.

FIG. 3.12 VALVE ASSEMBLIES — EDWP

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 4 STEEL COMPONENTS

1 SCOPE

1.1 This part specifies the requirements of all steel and stainless steel components used in the assembly of each type of handpump (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the components covered in this part, shall apply.

2 CONSTRUCTION

2.1 The constructional details of different components covered in this part shall be as given in Fig. 4.1 to 4.30.

2.2 The material and dimensions shall meet the related prerequisites given in **4** and **5** of Part 1.

2.3 The steel components shall be given anti-corrosive treatment as mentioned in **6** of Part 1.

3 TESTING

3.1 Group of each type of component covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 The critical dimensions of all the components selected as per **3.2** shall be checked for conformance with the relevant figures given in this part .

3.4 The flanges shall be reasonably flat to provide proper matching of the holes to ensure unrestricted insertion of the bolts when assembled with counterpart.

3.5 The connecting rods/plunger rods shall be examined for straightness and formation of threads.

3.6 Criteria for Conformity

3.6.1 The individual lot of components, as defined in **3.1**, shall be considered conforming to the requirements of the standard, if the batch for the particular lot selected according to **3.2** satisfy the requirements given in **3.6.2**.

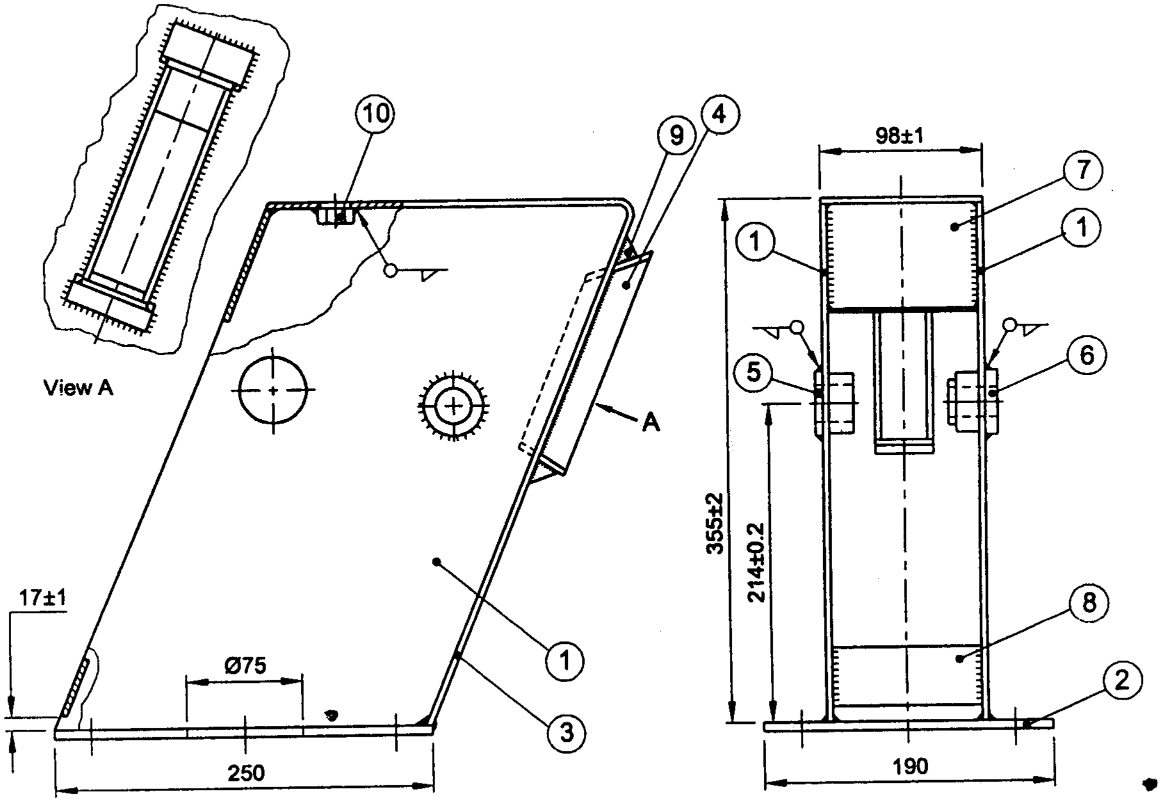
3.6.2 The number of components not meeting the requirements of a characteristic inspected under **3.3** to **3.5** (whichever applicable) shall not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

4 MARKING

The requirements given in **11.5.1** and **11.5.2** of Part 1 shall be followed.

5 PACKING

The requirements of **12.1** and **12.2** of Part 1 shall apply.



10	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
9	2	Gusset — Standard	Fig. 4.3K	Mild Steel	Grade A IS 2062
8	1	Front Bottom End Plate	Fig. 4.3J	Mild Steel	Grade A IS 2062
7	1	Front Top End Plate	Fig. 4.3I	Mild Steel	Grade A IS 2062
6	1	Axle Bush — Left	Fig. 4.3H	Mild Steel	Grade A IS 2062
5	1	Axle Bush — Right	Fig. 4.3G	Mild Steel	Grade A IS 2062
4	1	Bracket — Standard	Fig. 4.3D	Mild Steel	Grade A IS 2062
3	1	Back Plate — Standard	Fig. 4.3C	Mild Steel	Grade A IS 2062
2	1	Head Flange	Fig. 4.3B	Mild Steel	Grade A IS 2062
1	2	Side Plate	Fig. 4.3A	Mild Steel	Grade A IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

1 Inside fillet welding of side plates and back plate to flange should be 3.2 mm, *Min.*

2 Welding fillet in other places should be 4 mm, *Min.*

3 The side plate shall be welded inside and outside as shown in the drawing.

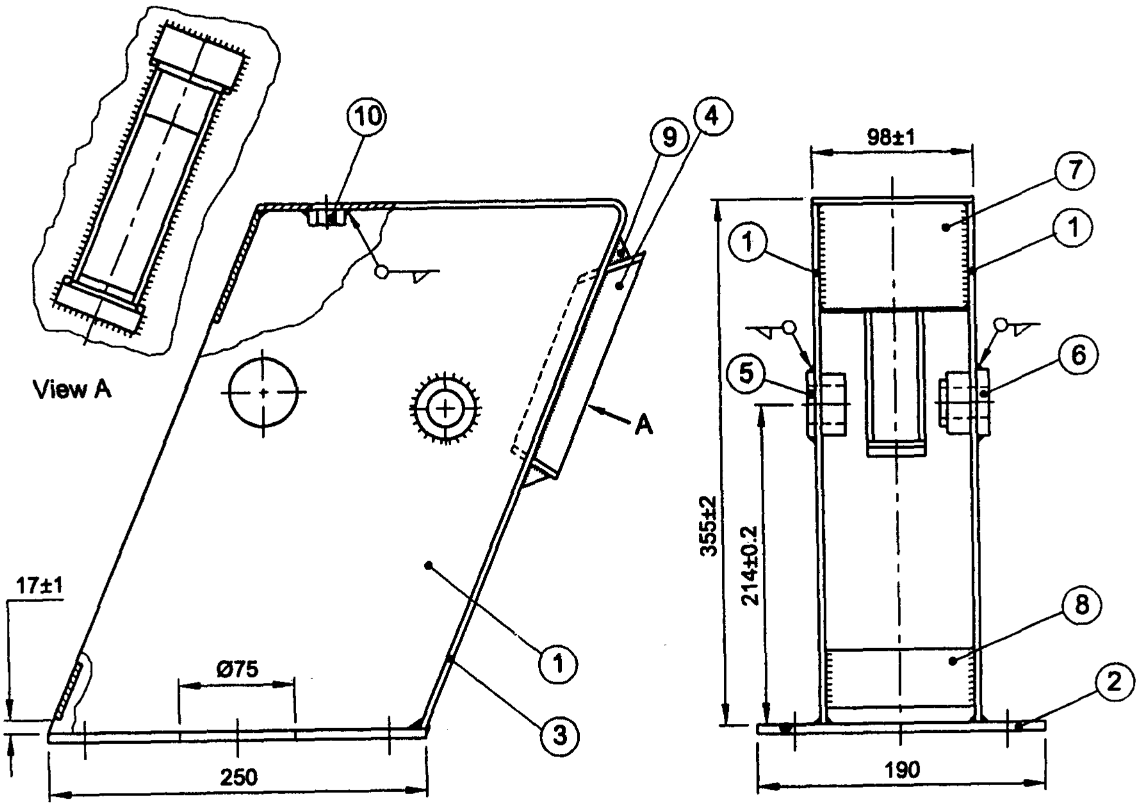
4 The head assembly shall be welded from inside and outside. The outside seal welding run shall be ground smooth.

5 Reaming of the left and right axle bushes shall be done to ensure internal dimensions and alignment.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.1 HEAD — STANDARD
(For SDWP, VLOM-65 and VLOM-50)



10	1	Hexagonal Nut — M12	Std 04	Steel	Annex B
9	2	Gusset — EDWP	Fig. 4.3L	Mild Steel	Grade A IS 2062
8	1	Front Bottom End Plate	Fig. 4.3J	Mild Steel	Grade A IS 2062
7	1	Front Top End Plate	Fig. 4.3I	Mild Steel	Grade A IS 2062
6	1	Axle Bush — Left	Fig. 4.3H	Mild Steel	Grade A IS 2062
5	1	Axle Bush — Right	Fig. 4.3G	Mild Steel	Grade A IS 2062
4	1	Bracket — EDWP	Fig. 4.3F	Mild Steel	Grade A IS 2062
3	1	Back Plate — EDWP	Fig. 4.3E	Mild Steel	Grade A IS 2062
2	1	Head Flange	Fig. 4.3B	Mild Steel	Grade A IS 2062
1	2	Side Plate	Fig. 4.3A	Mild Steel	Grade A IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

1 Inside fillet welding of side plates and back plate to flange should be 3.2 mm, *Min.*

2 Welding fillet in other places should be 4 mm, *Min.*

3 The side plate shall be welded inside and outside as shown in the drawing.

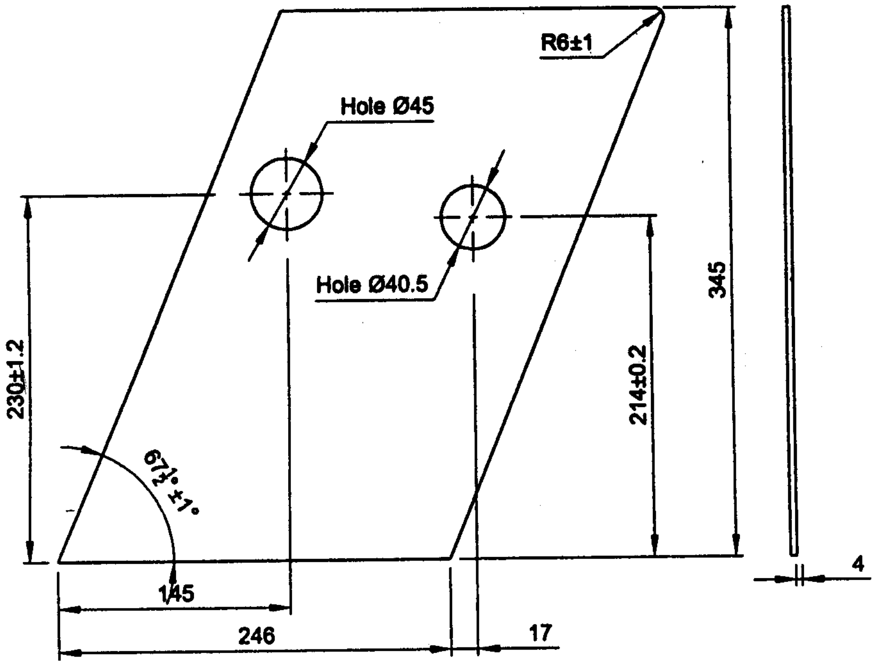
4 The head assembly shall be welded from inside and outside. The outside seal welding run shall be ground smooth.

5 Reaming of the left and right axle bushes shall be done to ensure internal dimensions and alignment.

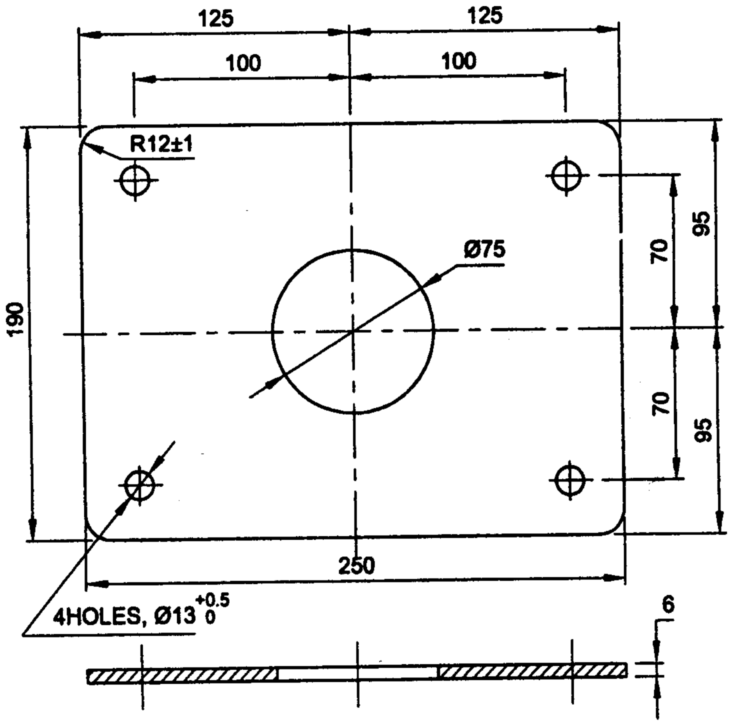
Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.2 HEAD — EWDP



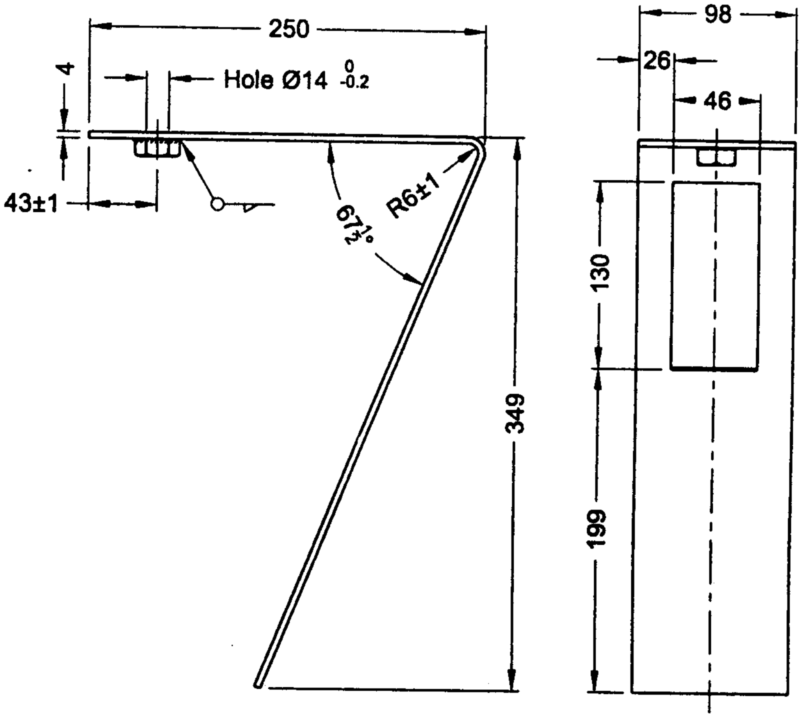
4.3A Side Plate



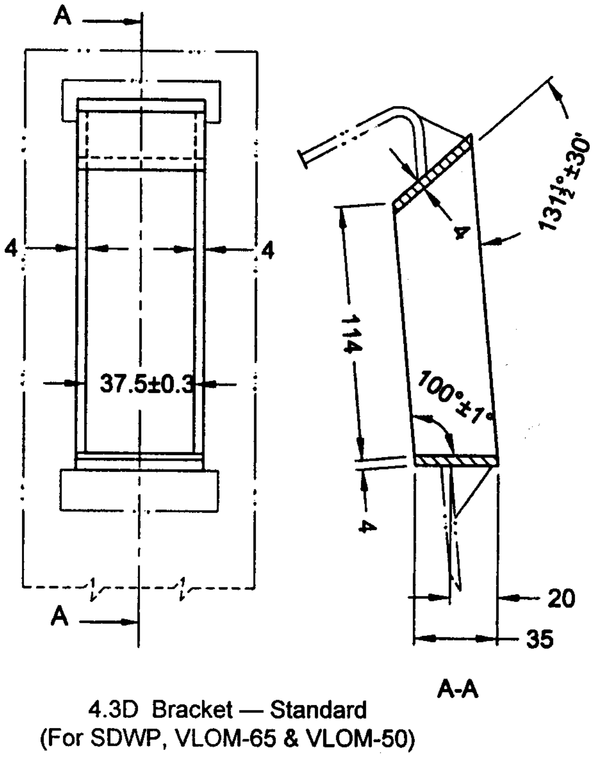
4.3B Head Flange

Manufacturing tolerance to be ±0.5 unless otherwise specified.
All dimensions in millimetres.

FIG. 4.3 PARTS OF HEAD (*Continued*)



4.3C Back Plate — Standard
(For SDWP, VLOM-65 & VLOM-50)

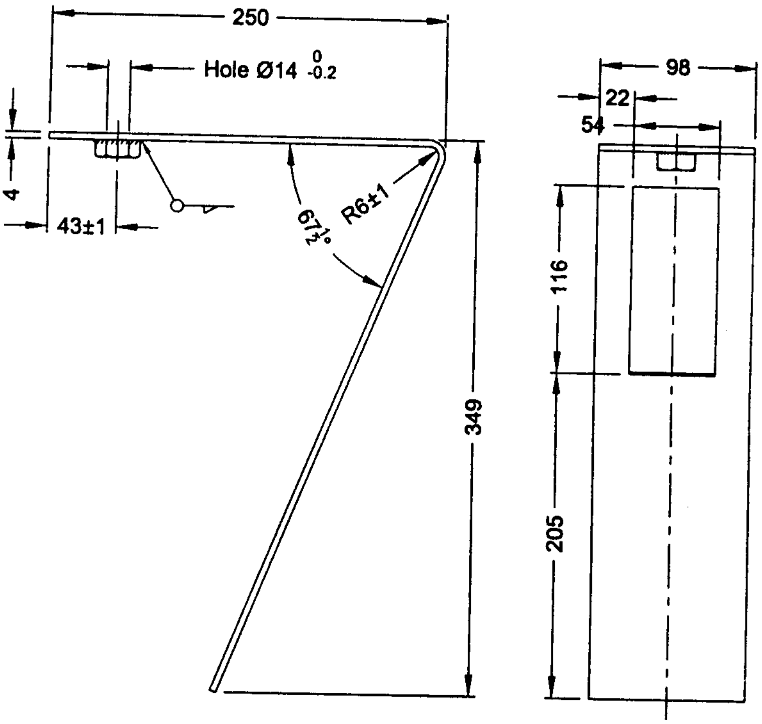


4.3D Bracket — Standard
(For SDWP, VLOM-65 & VLOM-50)

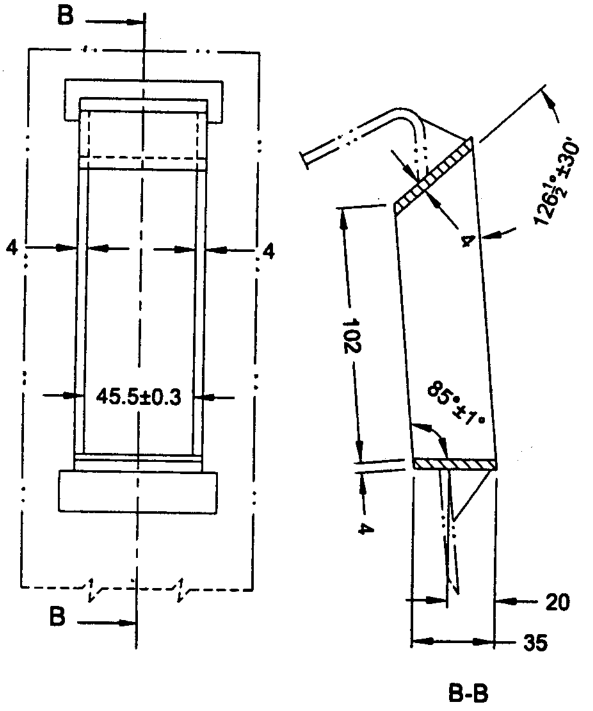
Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.3 PARTS OF HEAD (*Continued*)



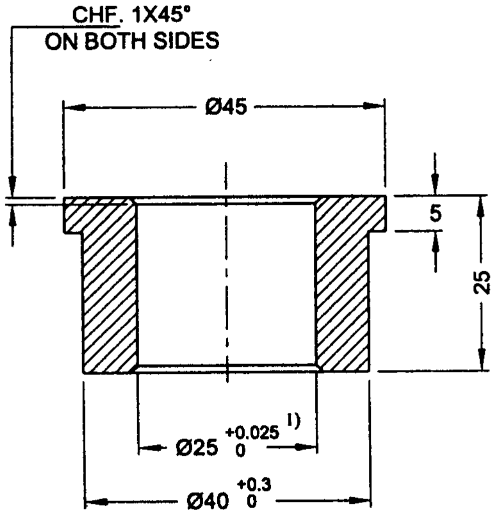
4.3E Back Plate — EDWP



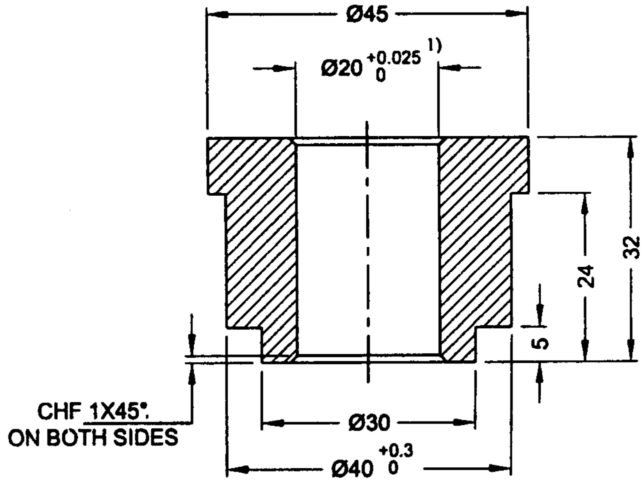
4.3F Bracket — EDWP

Manufacturing tolerance to be ±0.5 unless otherwise specified.
All dimensions in millimetres.

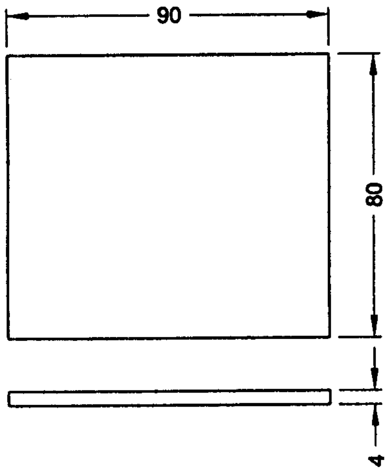
FIG. 4.3 PARTS OF HEAD (*Continued*)



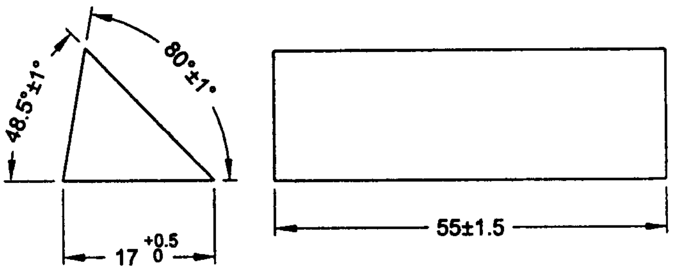
4.3G Axle Bust — Right



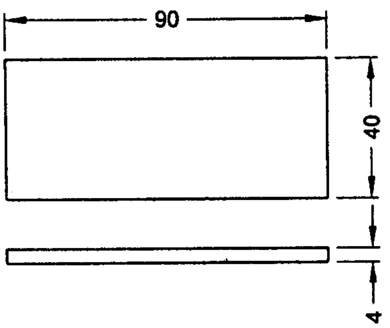
4.3H Axle Bust — Left



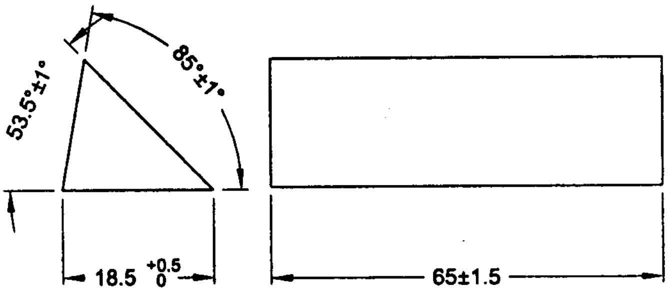
4.3 I Front Top End Plate



4.3K Gusset — Standard
(For SDWP, VLOM-65 & VLOM-50)



4.3J Front Bottom End Plate



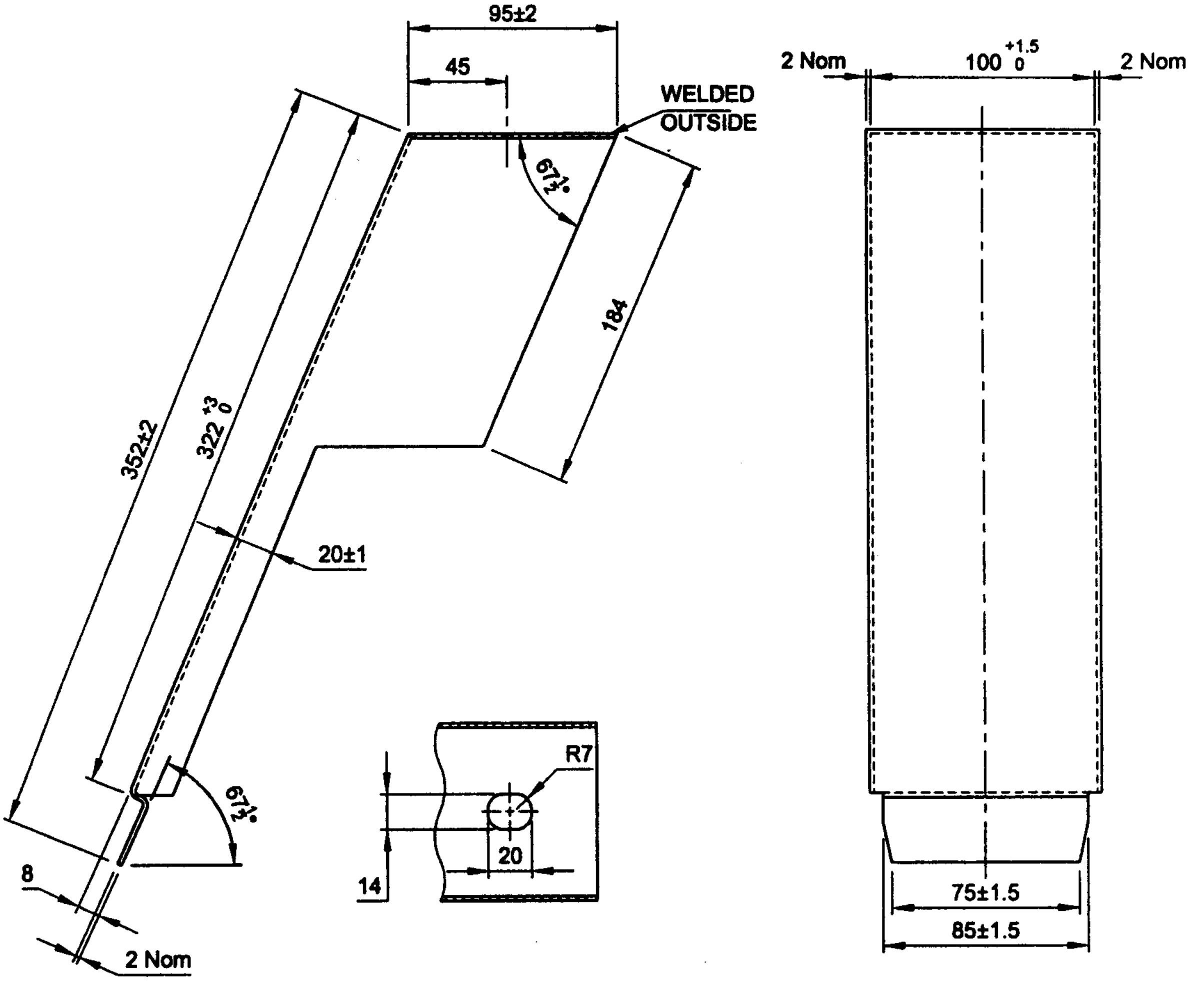
4.3L Gusset — EDWP
(For EDWP)

[1] Indicates critical dimensions.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

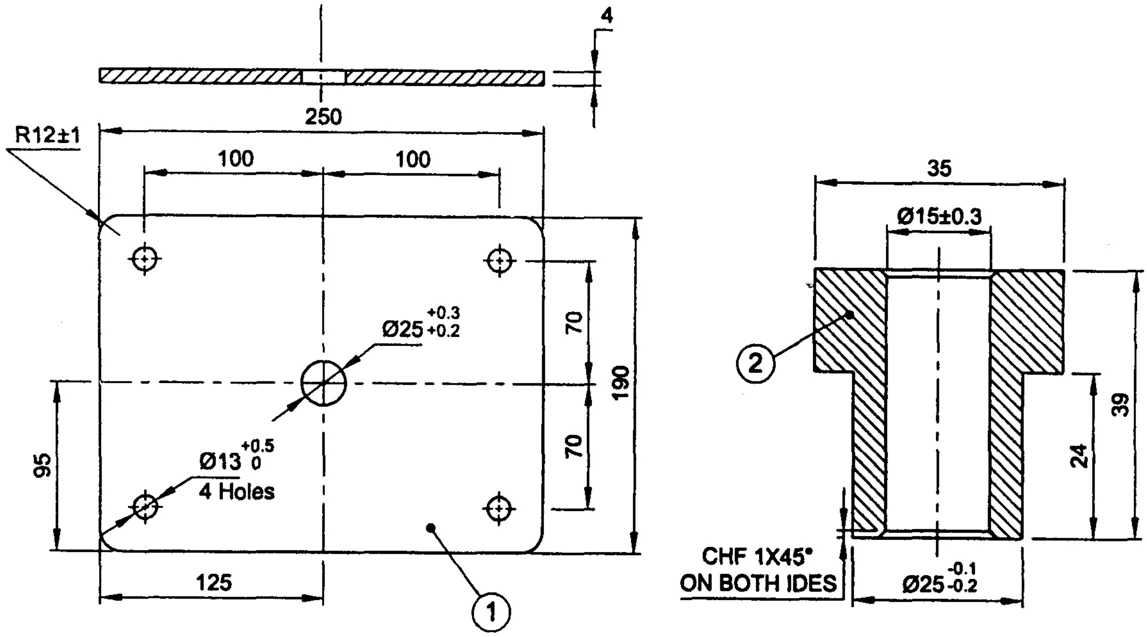
All dimensions in millimetres.

FIG. 4.3 PARTS OF HEAD (*Concluded*)



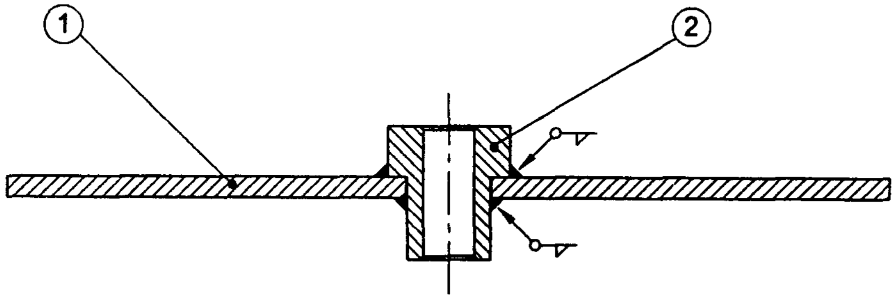
Manufacturing tolerance to be ±0.5 unless otherwise specified.
All dimensions in millimetres.

FIG. 4.4 FRONT COVER



4.5A Flange for Third Plate

4.5B Guide Bush

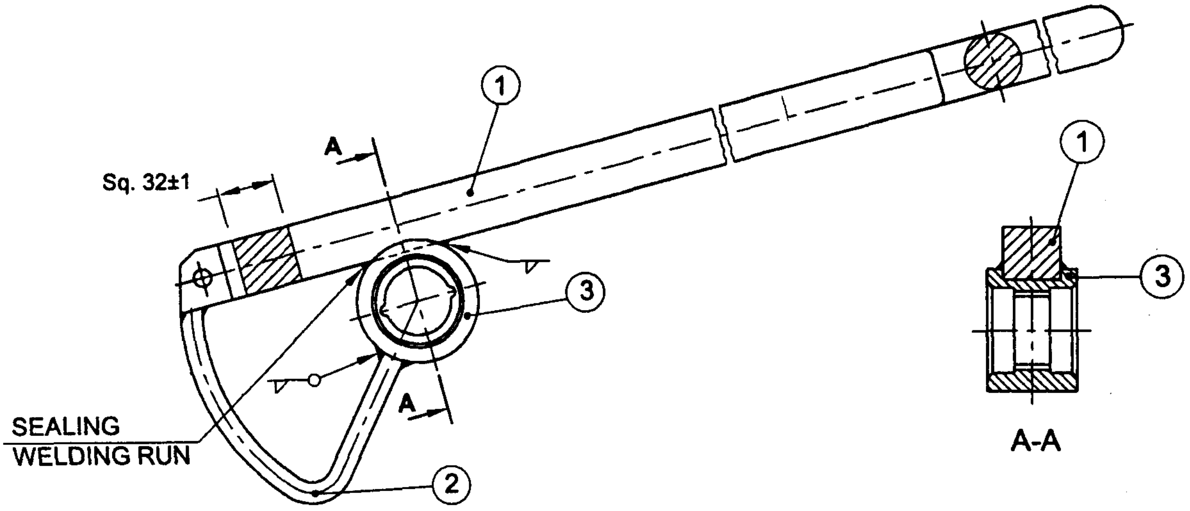


2 1	1 1	Guide Bush Flange for Third Plate	Fig. 4.5B Fig. 4.5A	Mild Steel Mild Steel	Grade A of IS 2062 Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.5 THIRD PLATE

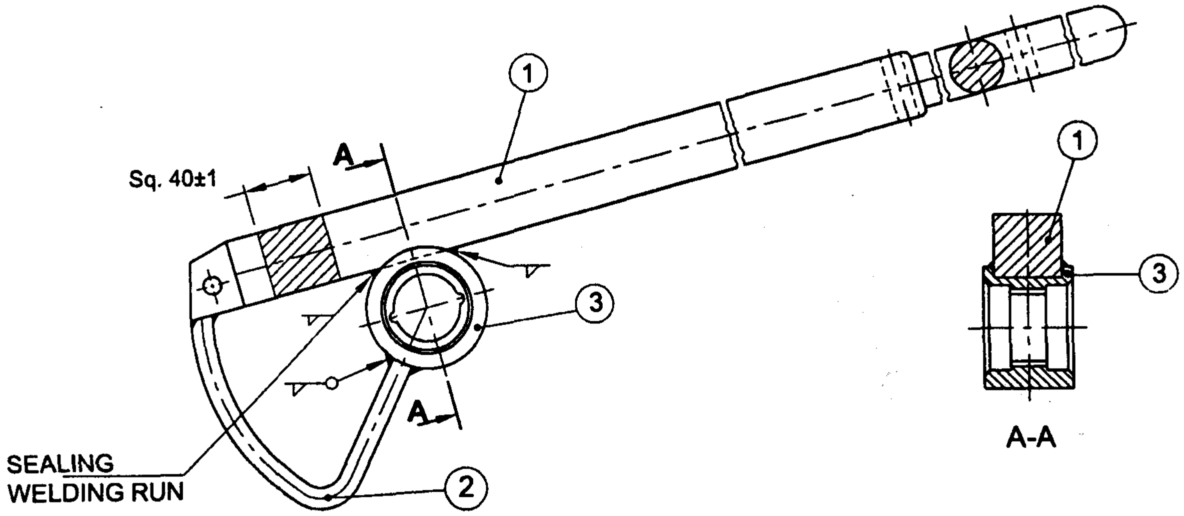


3	1	Bearing Housing	Fig. 4.8D	Mild Steel	Grade A of IS 2062
2	1	Chain Guide	Fig. 4.8C	Mild Steel	Grade A of IS 2062
1	1	Handle Bar—Standard	Fig. 4.8A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTE — Welding fillet shall not be less than 6 mm at all places.

All dimensions in millimetres.

FIG. 4.6 HANDLE — STANDARD
(For SDWP, VLOM-65 & VLOM-50)

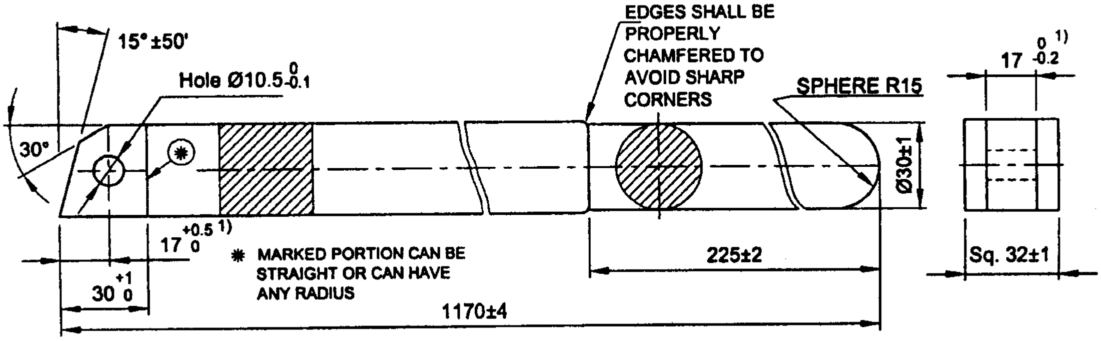


3	1	Bearing Housing	Fig. 4.8D	Mild Steel	Grade A of IS 2062
2	1	Chain Guide	Fig. 4.8C	Mild Steel	Grade A of IS 2062
1	1	Handle Bar — EDWP	Fig. 4.8B	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

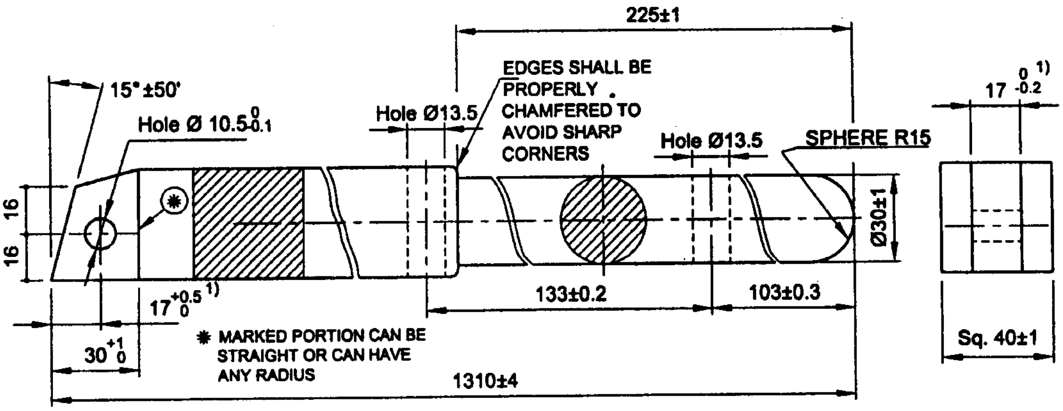
NOTE — Welding fillet shall not be less than 6 mm at all places.

All dimensions in millimetres.

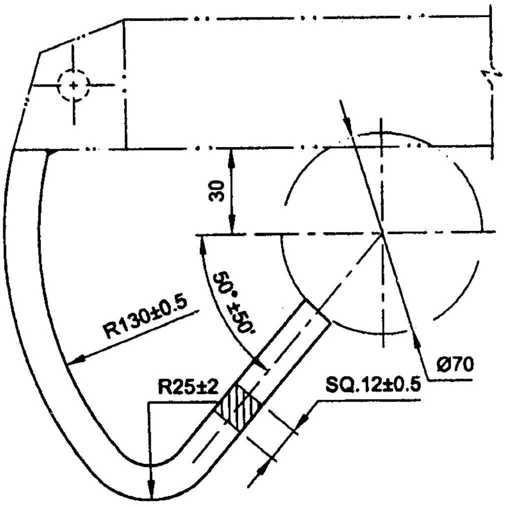
FIG. 4.7 HANDLE — EDWP


15°±50'
Hole Ø10.5 0 -0.1
30°
EDGES SHALL BE PROPERLY CHAMFERED TO AVOID SHARP CORNERS
SPHERE R15
17 0 -0.2 1)
Ø30±1
17 +0.5 0 1)
30 +1 0
✱ MARKED PORTION CAN BE STRAIGHT OR CAN HAVE ANY RADIUS
225±2
Sq. 32±1
1170±4

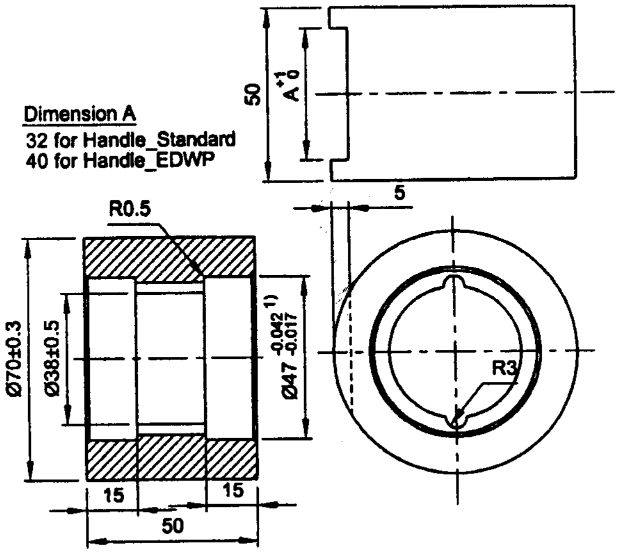
4.8A Handle Bar — Standard
(For SDWP, VLOM-65 & VLOM-50)



4.8B Handle Bar — EDWP



4.8C Chain Guide



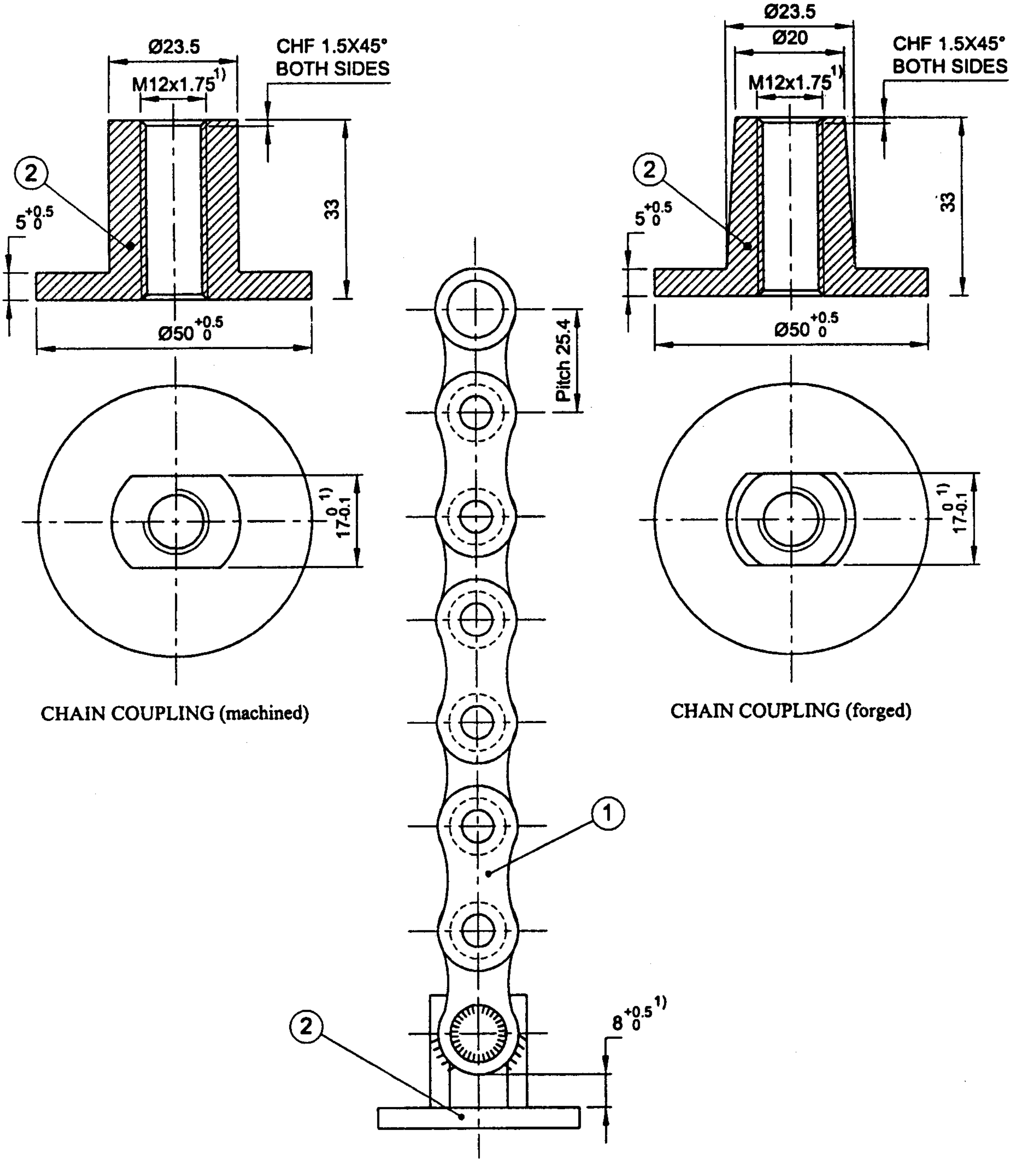
Manufacturing tolerance to be ±0.1 unless otherwise specified.

4.8D Bearing Housing

[1)] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 4.8 PARTS OF HANDLE



CHAIN COUPLING (machined)

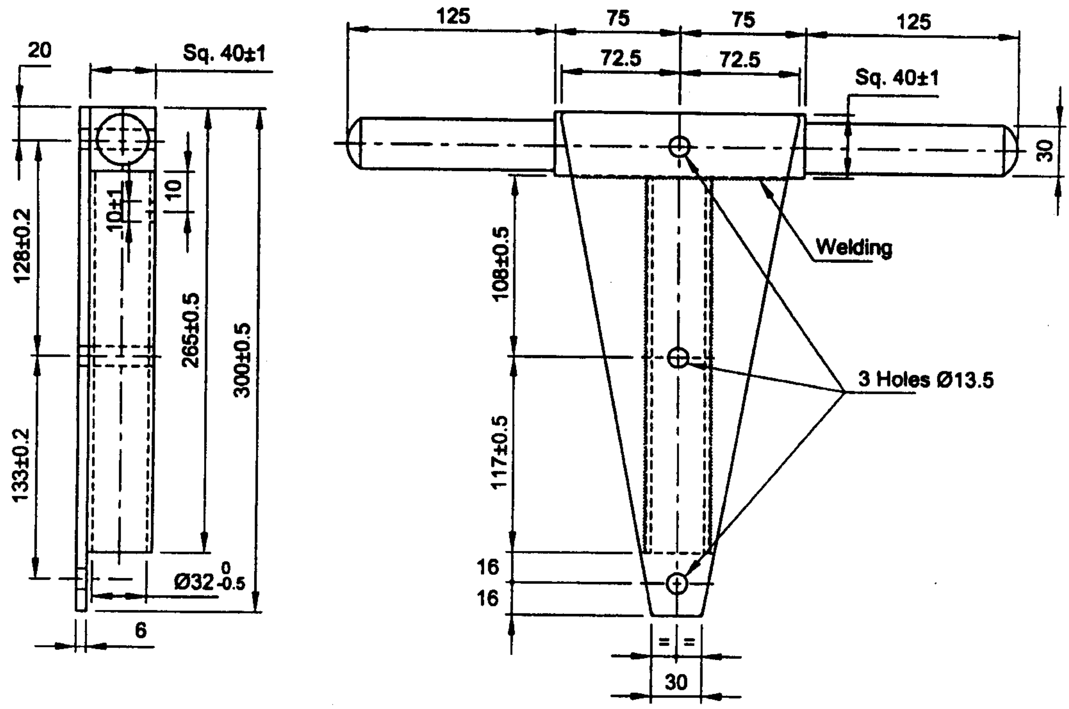
CHAIN COUPLING (forged)

2	1	Chain Coupling	—	Mild Steel	Grade A of IS 2062
1	1	Roller Chain, 25.4 Pitch	Std 16	—	Annex B
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 4.9 CHAIN WITH COUPLING



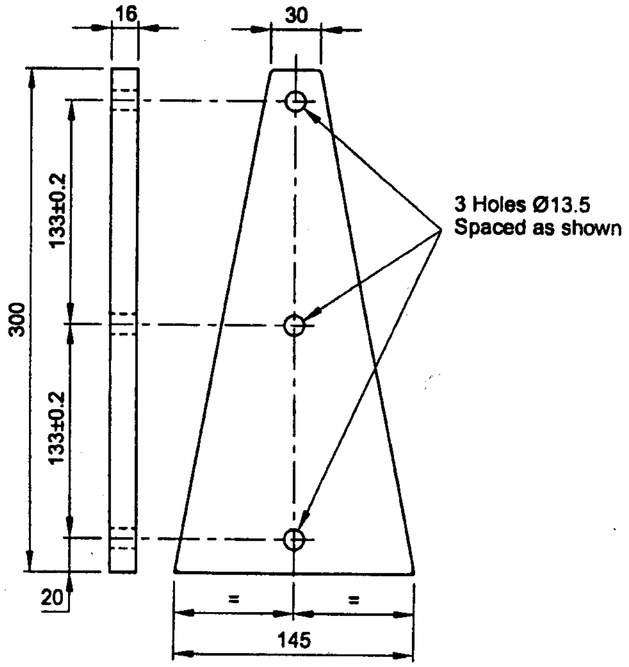
Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.10 T-BAR
(For EDWP only)

Counter Weight Requirement

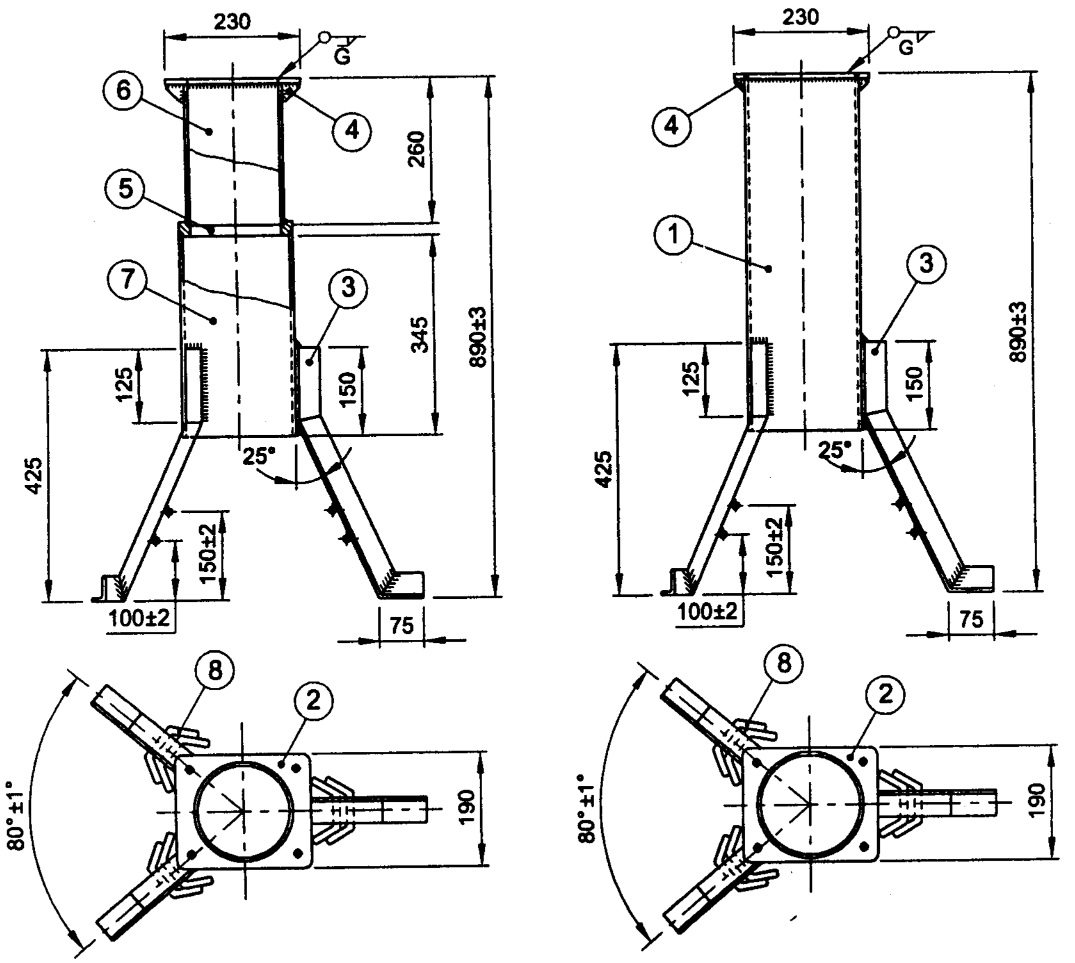
Cylinder Setting	No. of Weights
Up to 60 m	None
60 m to 70 m	One
70 m to 80 m	Two
80 m to 90 m	Three



Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.11 COUNTER WEIGHT
(For EDWP only)



4.12A Telescopic Stand — Standard
(For borewell with 150 NB casing pipe)

4.12B Normal Stand — Standard
(For borewell with 100/125 NB casing pipe)

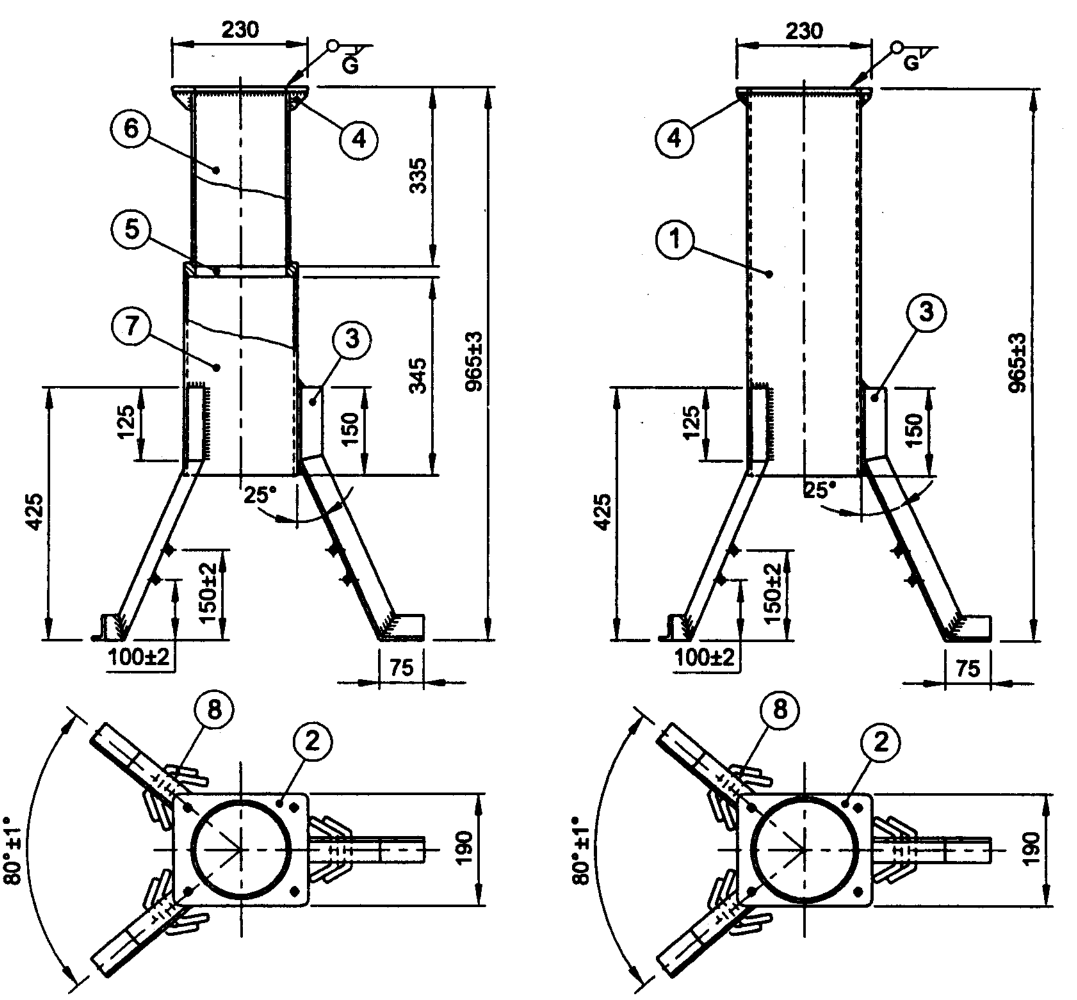
8	6	Spikes	Fig. 4.14G	Mild Steel/ Bright Bar	Grade A of IS 2062/ Grade 2 or 3 of IS 9550
7	1	Bottom Pipe — 175 NB	—	Steel Tube	IS 1161 — medium (*see* Note)
6	1	Top Pipe — 150 NB	—	Mild Steel Tube	IS 1239 (Part 1) — medium
5	1	Reducer Coller	Fig. 4.14F	Mild Steel	Grade A of IS 2062
4	2	Gusset	Fig. 4.14E	Mild Steel	Grade A of IS 2062
3	3	Leg	Fig. 4.14D	HR Section	IS 808
2	1	Stand Flange	Fig. 4.14C	Mild Steel	Grade A of IS 2062
1	1	Stand Pipe — Standard	Fig. 4.14A	Mild Steel Tube	IS 1239 (Part 1) — medium
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTE — In case of non-availability, 175 NB pipe may be rolled and welded from 4 mm sheet conforming to Grade A of IS 2062 keeping other dimensions as per IS 1161.

Manufacturing tolerance to be ± 0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.12 STAND — STANDARD
(For SDWP, VLOM-65 & VLOM-50)



4.13A Telescopic Stand — EDWP
(For borewell with 150 NB casing pipe)

4.13B Normal Stand — EDWP
(For borewell with 100/125 NB casing pipe)

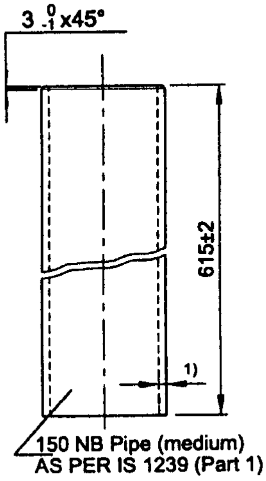
Part No.	No. Off	Description	Reference	Material	
8	6	Spikes	Fig. 4.14G	Mild Steel/ Bright Bar	Grade A of IS 2062/ Grade 2 or 3 of IS 9550
7	1	Bottom Pipe — 175 NB	—	Steel Tube	IS 1161 — medium (*see* Note)
6	1	Top Pipe — 150 NB	—	Mild Steel Tube	IS 1239 (Part 1) — medium
5	1	Reducer Coller	Fig. 4.14F	Mild Steel	Grade A of IS 2062
4	2	Gusset	Fig. 4.14E	Mild Steel	Grade A of IS 2062
3	3	Leg	Fig. 4.14D	HR Section	IS 808
2	1	Stand Flange	Fig. 4.14C	Mild Steel	Grade A of IS 2062
1	1	Stand Pipe — Standard	Fig. 4.14B	Mild Steel Tube	IS 1239 (Part 1) — medium

NOTE — In case of non-availability, 175 NB pipe may be rolled and welded from 4 mm sheet conforming to Grade A of IS 2062 keeping other dimensions as per IS 1161.

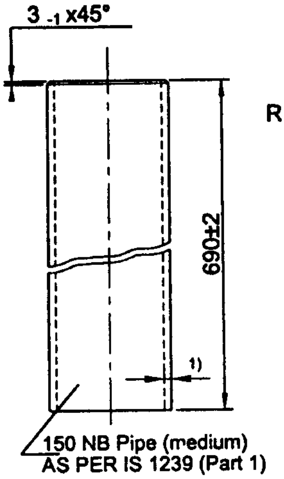
Manufacturing tolerance to be ± 0.5 unless otherwise specified.

All dimensions in millimetres.

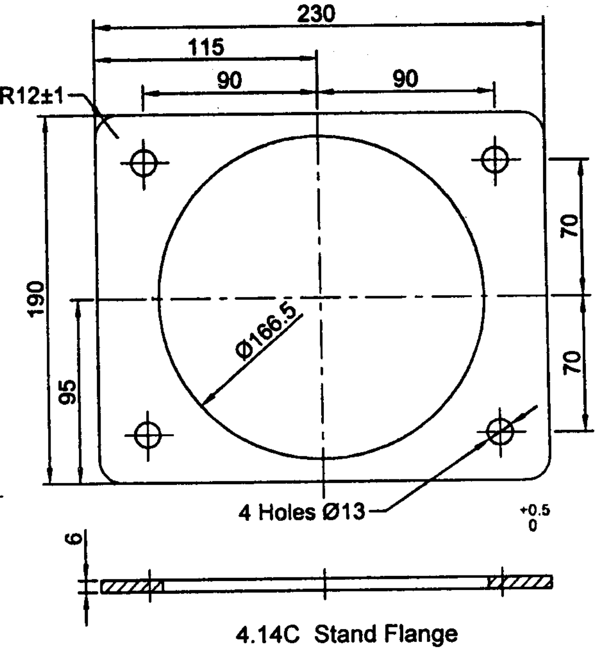
FIG. 4.13 STAND — EDWP



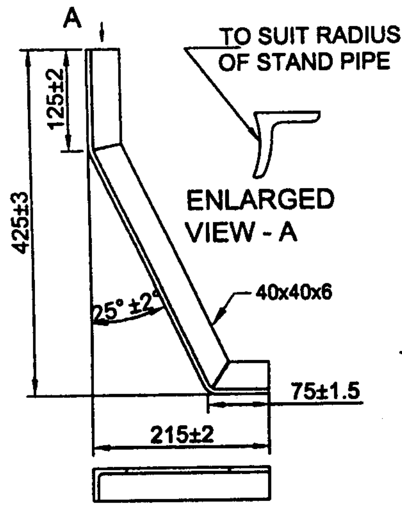
4.14A Stand Pipe — Standard (For SDWP, VLOM-65, VLOM-50)



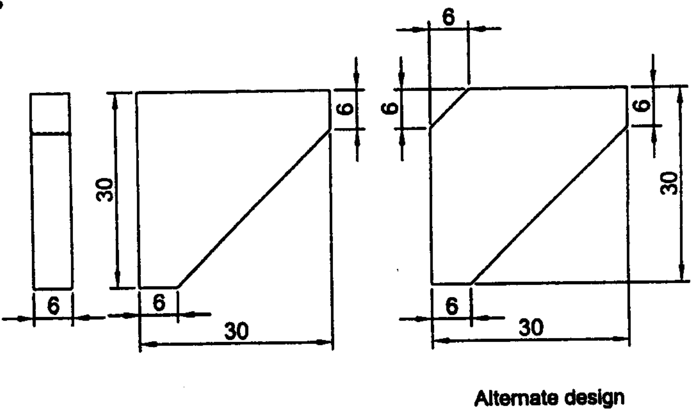
4.14B Stand Pipe — EDWP (For EDWP)



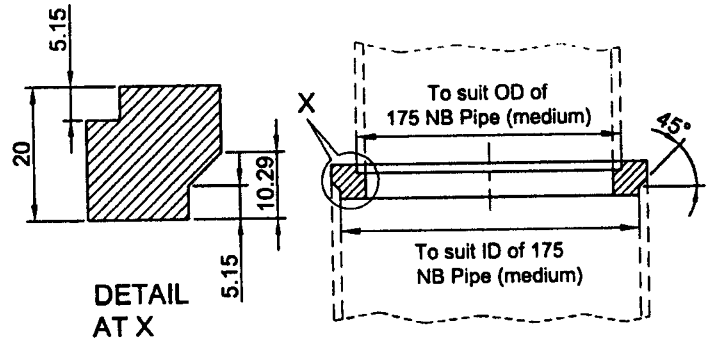
4.14C Stand Flange



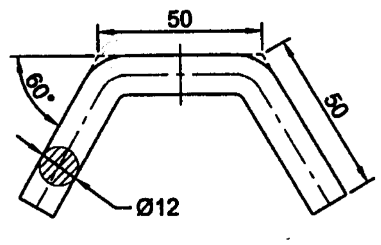
4.14D Leg



4.14E Gusset


5.15
20
10.29
5.15
DETAIL AT X
X
To suit OD of 175 NB Pipe (medium)
45°
To suit ID of 175 NB Pipe (medium)

4.14F Reducer Coller



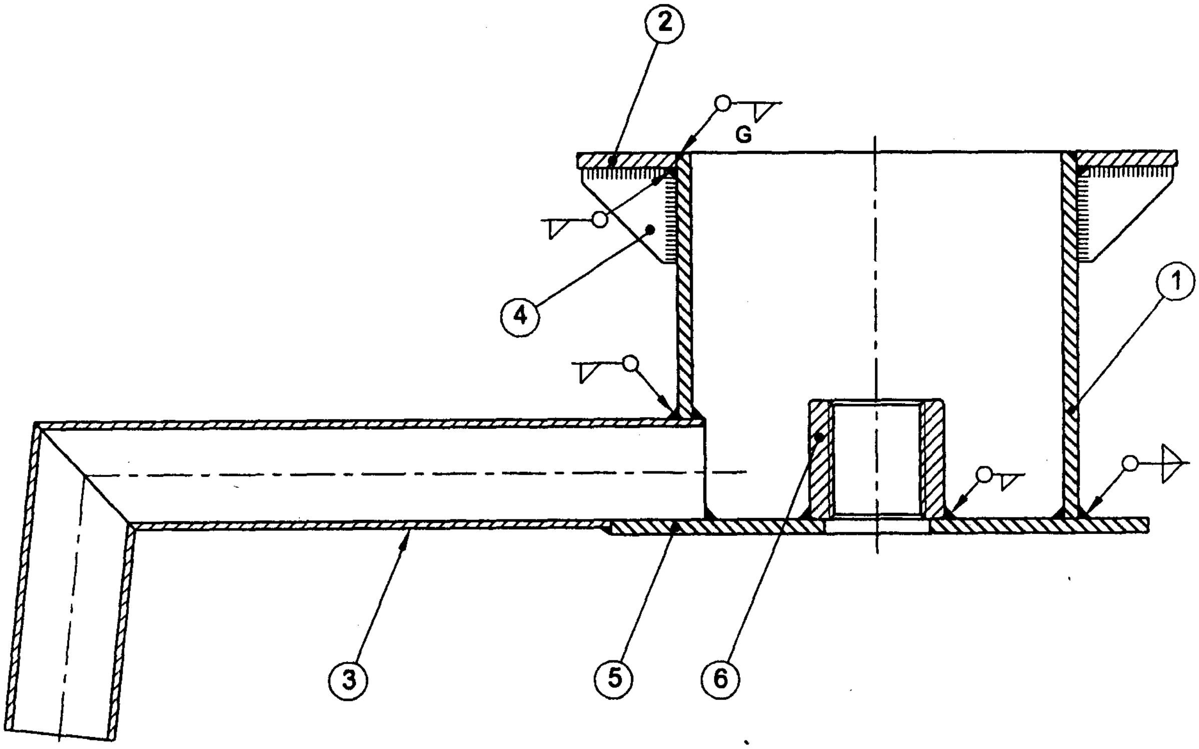
4.14G Spike

[1] Indicates critical dimensions.

Manufacturing tolerance to be ± 0.5 unless otherwise specified.

All dimensions in millimetres.

Fig. 4.14 Parts of Stand



6	1	Riser Pipe Holder — 32	Fig. 4.18F	Mild Steel	Grade A of IS 2062
5	1	Tank Bottom Flange — 32	Fig. 4.18E	HR Section	Grade A of IS 2062
4	2	Gusset	Fig. 4.18D	Mild Steel	Grade A of IS 2062
3	1	Spout	Fig. 4.18C	MS Tube 40 NB	Medium, IS 1239 (Part 1)
2	1	Tank Top Flange	Fig. 4.18B	Mild Steel	Grade A of IS 2062
1	1	Tank Pipe	Fig. 4.18A	MS Tube 150 NB	Medium, IS 1239 (Part 1)
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

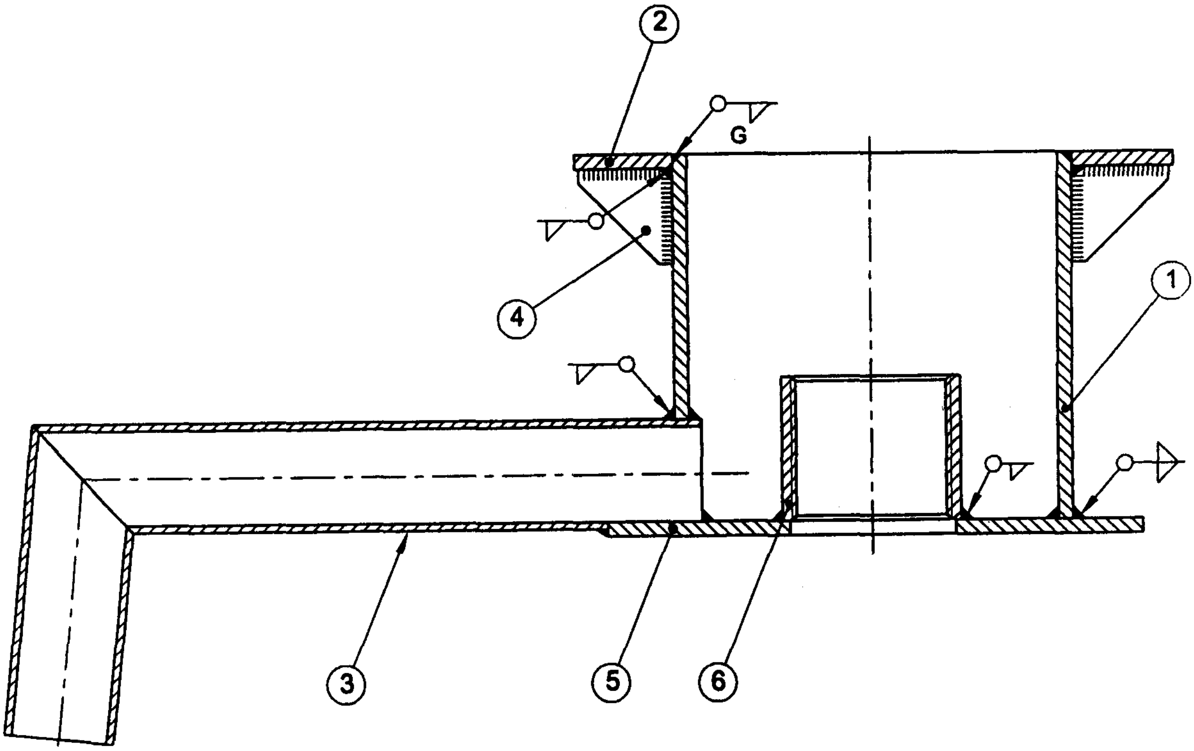
1 Fillet size of weld at all places shall be 5 mm minimum, excepting spout where it shall not be less than 4 mm. The inside welding of the tank pipe shall be given a sealing run.

2 One side of the coupling to be faced.

3 Sealing run on the top flange to be ground smooth.

4 Verticality of the riser pipe holder to be ensured during fabrication.

FIG. 4.15 WATER TANK — 32
(For SDWP & EDWP)



6	1	Riser Pipe Holder — 50	Fig. 4.18H	Mild Steel	Grade A of IS 2062
5	1	Tank Bottom Flange — 50	Fig. 4.18G	HR Section	Grade A of IS 2062
4	2	Gusset	Fig. 4.18D	Mild Steel	Grade A of IS 2062
3	1	Spout	Fig. 4.18C	MS Tube 40 NB	Medium, IS 1239 (Part 1)
2	1	Tank Top Flange	Fig. 4.18B	Mild Steel	Grade A of IS 2062
1	1	Tank Pipe	Fig. 4.18A	MS Tube 150 NB	Medium, IS 1239 (Part 1)
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

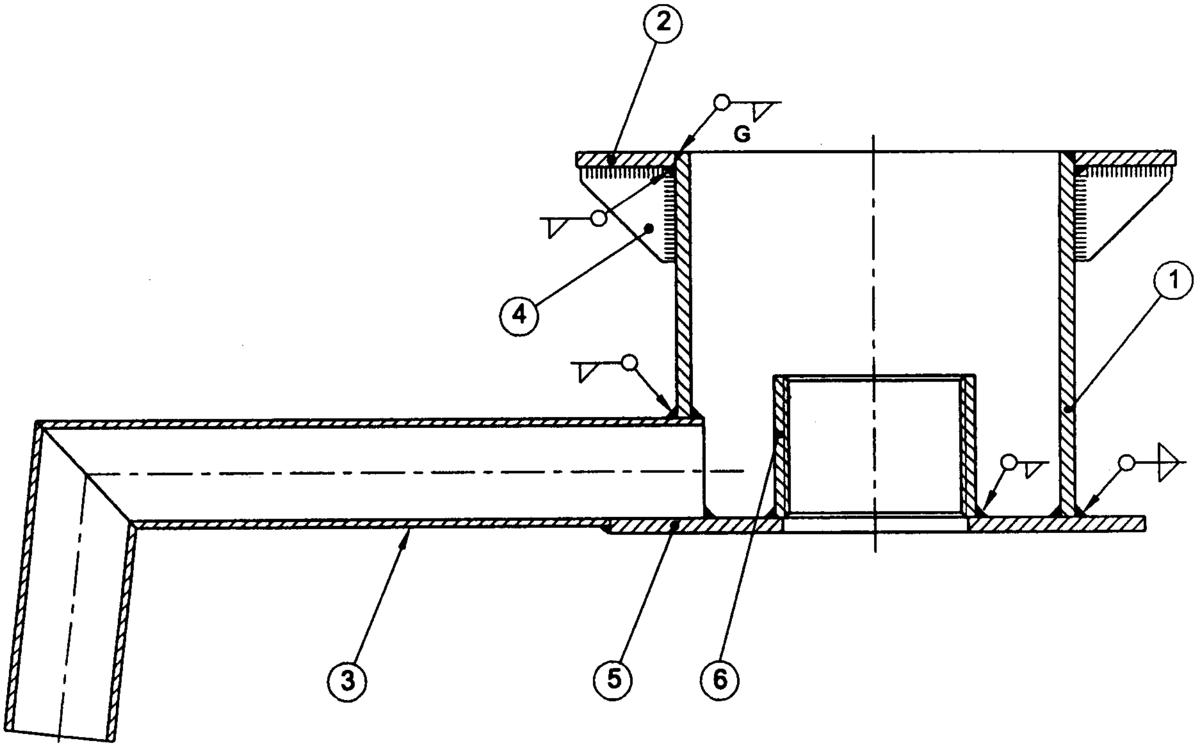
1 Fillet size of weld at all places shall be 5 mm minimum, excepting spout where it shall not be less than 4 mm. The inside welding of the tank pipe shall be given a sealing run.

2 One side of the coupling to be faced.

3 Sealing run on the top flange to be ground smooth.

4 Verticality of the riser pipe holder to be ensured during fabrication.

FIG. 4.16 WATER TANK — 50



Part No.	No. Off	Description	Reference	Material	
6	1	Riser Pipe Holder — 65	Fig. 4.18J	Mild Steel	Grade A of IS 2062
5	1	Tank Bottom Flange — 65	Fig. 4.18I	HR Section	Grade A of IS 2062
4	2	Gusset	Fig. 4.18D	Mild Steel	Grade A of IS 2062
3	1	Spout	Fig. 4.18C	MS Tube 40 NB	Medium, IS 1239 (Part 1)
2	1	Tank Top Flange	Fig. 4.18B	Mild Steel	Grade A of IS 2062
1	1	Tank Pipe	Fig. 4.18A	MS Tube 150 NB	Medium, IS 1239 (Part 1)

NOTES

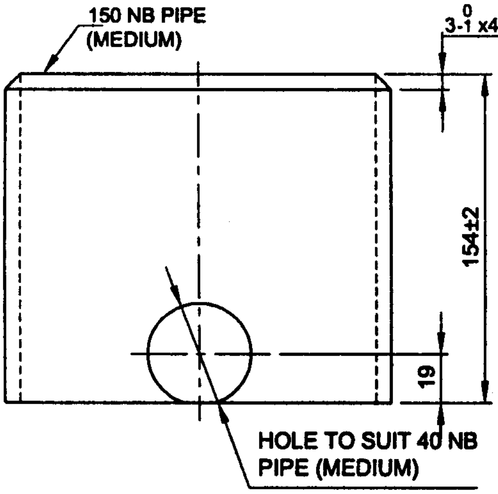
1 Fillet size of weld at all places shall be 5 mm minimum, excepting spout where it shall not be less than 4 mm. The inside welding of the tank pipe shall be given a sealing run.

2 One side of the coupling to be faced.

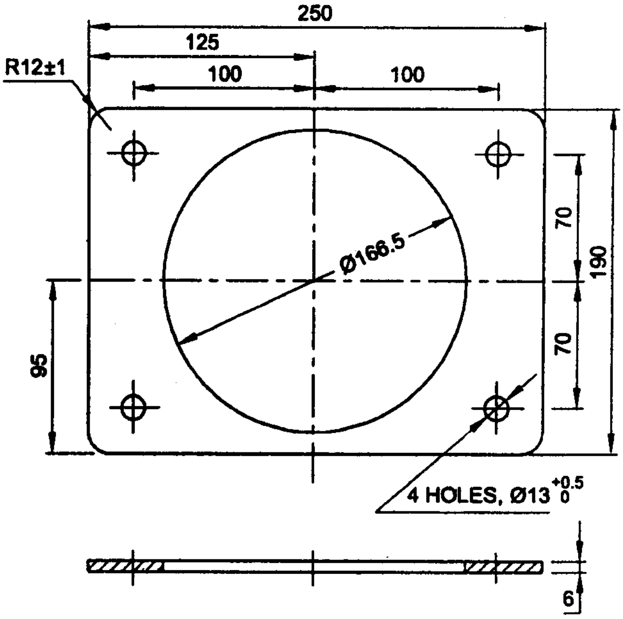
3 Sealing run on the top flange to be ground smooth.

4 Verticality of the riser pipe holder to be ensured during fabrication.

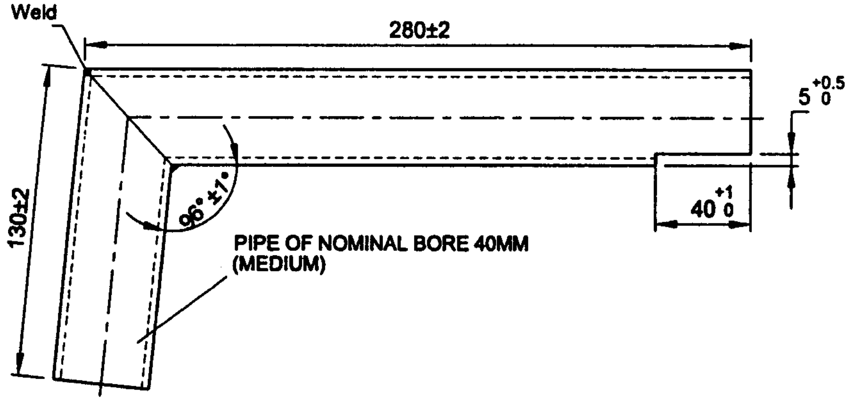
FIG. 4.17 WATER TANK — 65



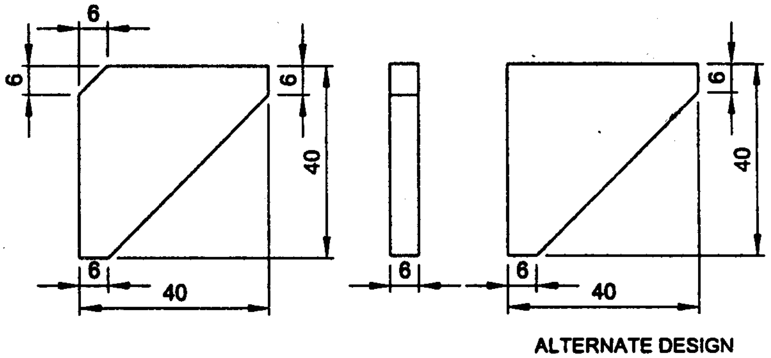
4.18A Tank Pipe



4.18B Tank Top Flange



4.18C Spout

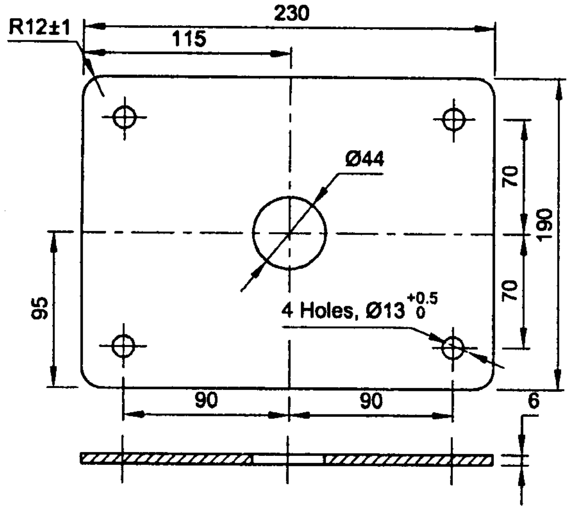


4.18D Gusset

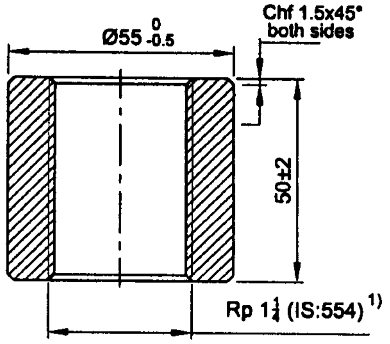
Manufacturing tolerance to be ± 0.5 unless otherwise specified.

All dimensions in millimetres.

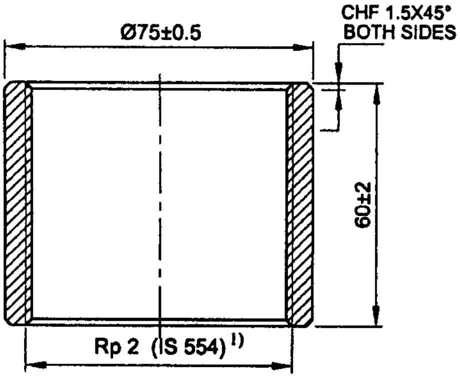
FIG. 4.18 PARTS OF WATER TANK (*Continued*)



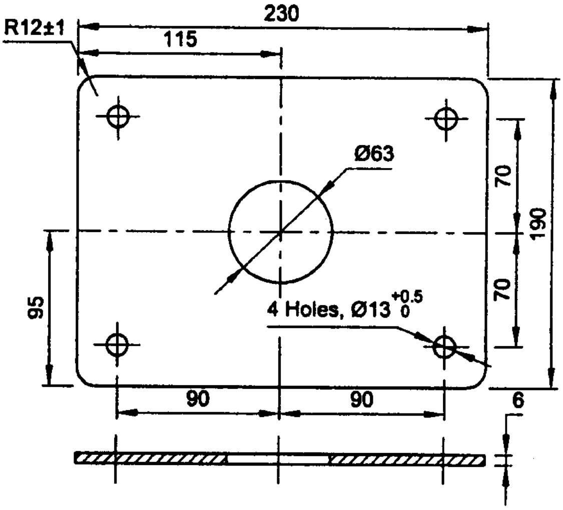
4.18E Tank Bottom Flange — 32
(For SWDP & EDWP)



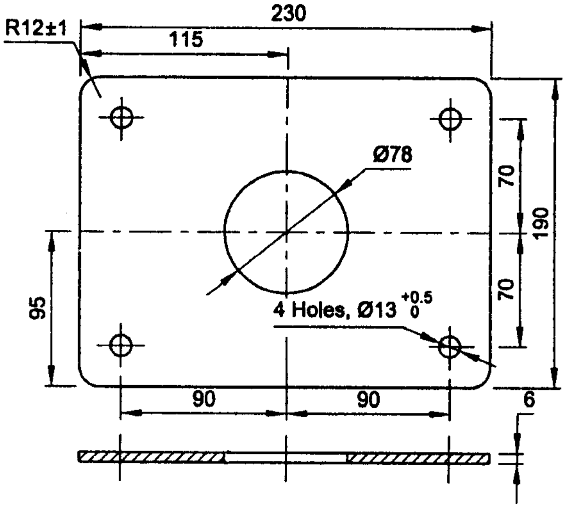
4.18F Riser Pipe Holder — 32
(For SWDP & EDWP)



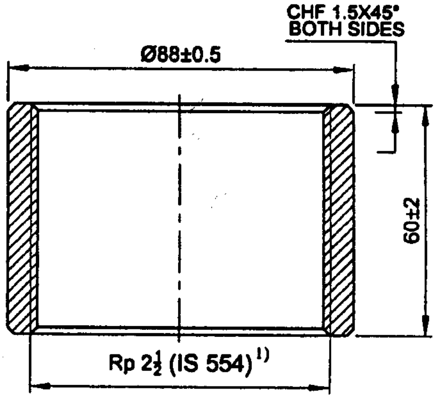
4.18G Riser Pipe Holder — 50



4.18H Tank Bottom Flange — 50



4.18 I Tank Bottom Flange — 65



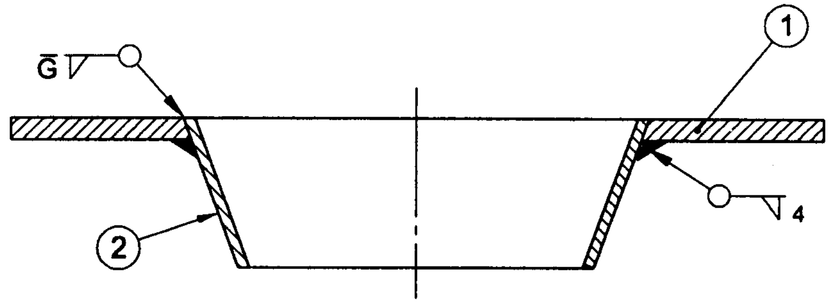
4.18J Riser Pipe Holder — 65

[1] Indicates critical dimensions.

Manufacturing tolerance to be ± 0·5 unless otherwise specified.

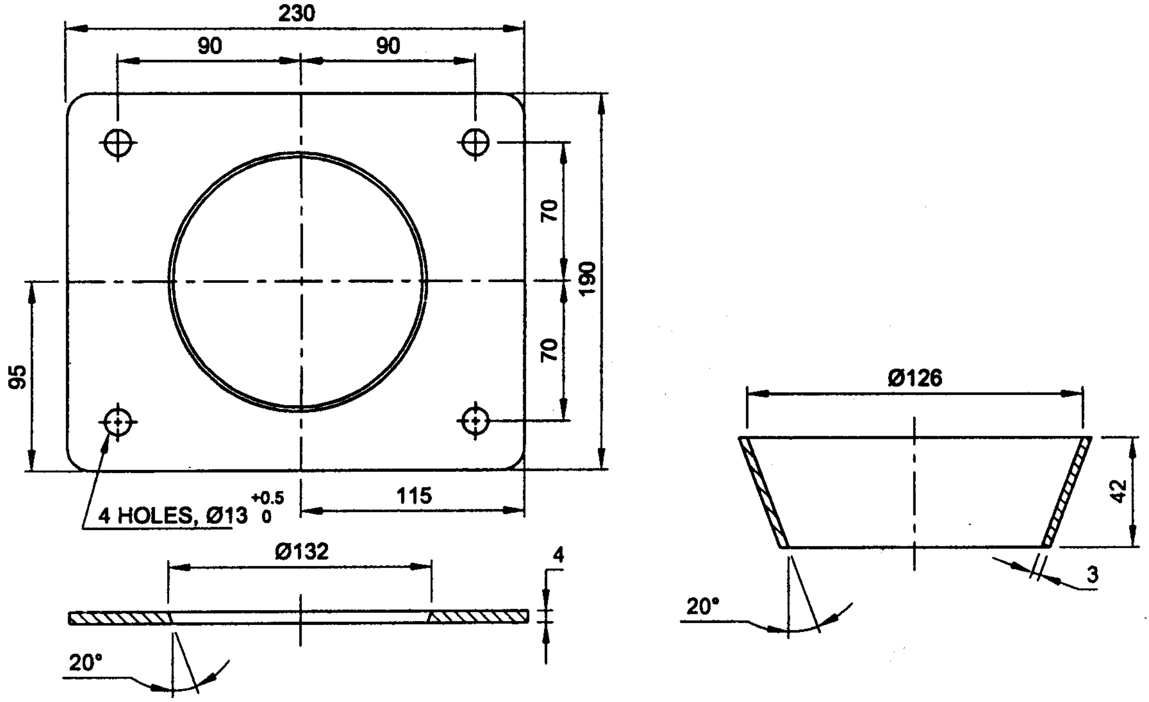
All dimensions in millimetres.

FIG. 4.18 PARTS OF WATER TANK (*Concluded*)



2	1	Steel Cone	Fig. 4.20B	Mild Steel	Grade A of IS 2062
1	1	Cone Flange	Fig. 4.20A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

FIG. 4.19 CONE PLATE



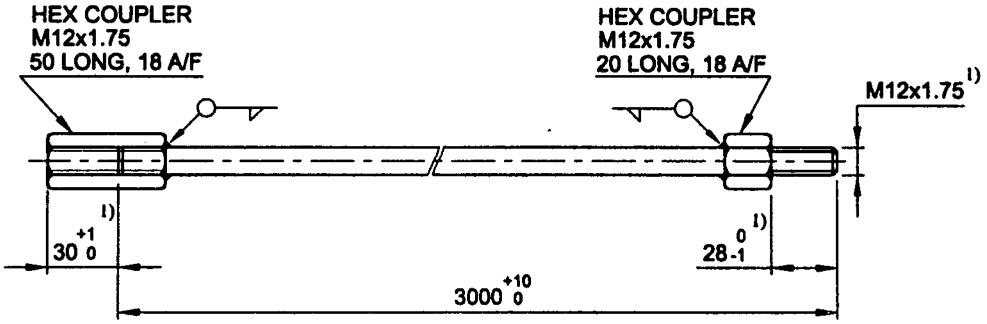
4.20A Cone Flange

4.20B Steel Cone

Manufacturing tolerance to be ± 0·5 unless otherwise specified.

All dimensions in millimetres.

FIG. 4.20 PARTS OF CONE PLATE



NOTES

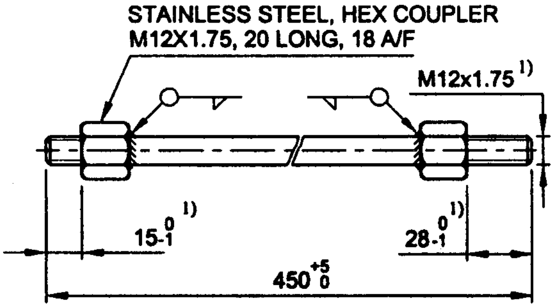
1 Electro-galvanizing according to IS 1573 service grade No. 4.

2 The tolerance of threads shall conform to IS 14962 (Part 3) class 6 g for bolts and 6H for nuts.

[1)] Indicates critical dimensions.

All dimensions in millimetres.

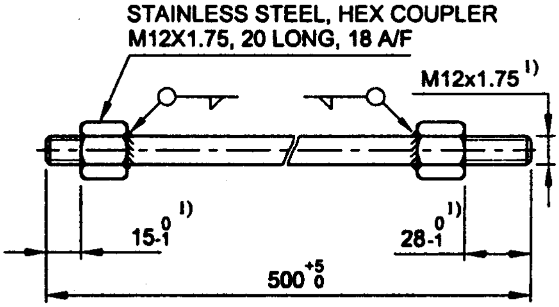
FIG. 4.21 CONNECTING ROD



[1)] Indicates critical dimensions.

All dimensions in millimetres.

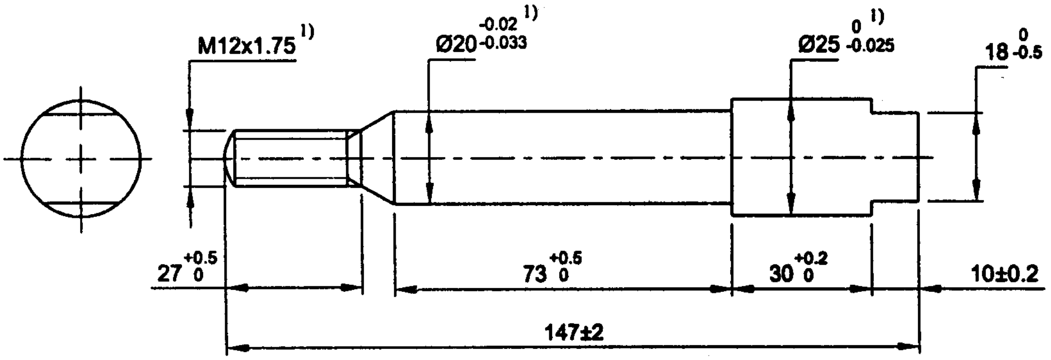
FIG. 4.22 PLUNGER ROD — STANDARD
(For SDWP)



[1)] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 4.23 PLUNGER ROD — LONG
(For EDWP, VLOM-65 & VLOM-50)

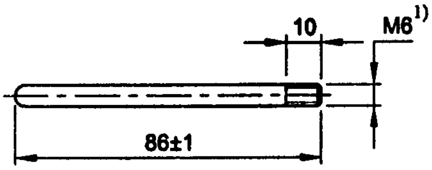


NOTE — Relief as per Type E of IS 3428 shall be provided.

[1)] Indicates critical dimensions.

All dimensions in millimetres.

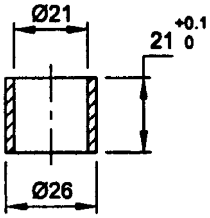
FIG. 4.24 HANDLE AXE



[1)] Indicates critical dimensions.

All dimensions in millimetres.

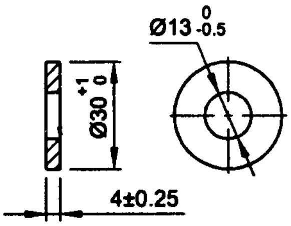
FIG. 4.25 PUSH ROD



[1)] Indicates critical dimensions.

All dimensions in millimetres.

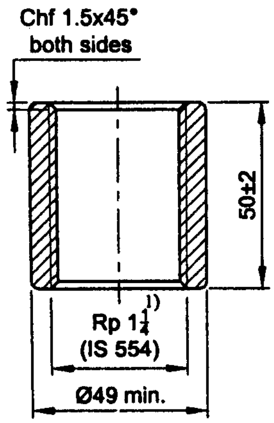
FIG. 4.26 BEARING SPACER



[1)] Indicates critical dimensions.

All dimensions in millimetres.

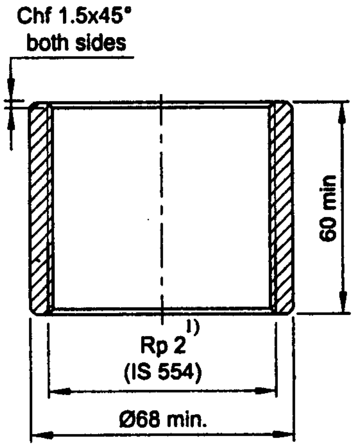
FIG. 4.27 WASHER



[1)] Indicates critical dimensions.

All dimensions in millimetres.

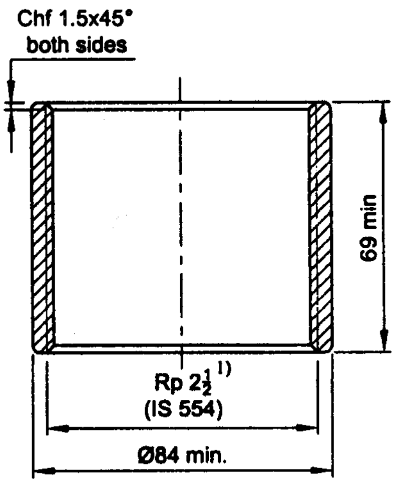
FIG. 4.28 SOCKET — 32
(For SDWP & EDWP)



[1)] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 4.29 SOCKET — 50
(For VLOM-50)



[1)] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 4.30 SOCKET — 65
(For VLOM-65)

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 5 CAST IRON COMPONENTS

1 SCOPE

1.1 This part specifies the requirements of cast iron components used in the assembly of each type of handpump (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the components covered in this part, shall apply.

2 CONSTRUCTION

2.1 The constructional details of different components covered in this part shall be as given in Fig. 5.1 to 5.6.

2.2 The material and dimensions shall meet the related prerequisites given in **4** and **5** of Part 1.

2.3 The exterior surfaces of the cast iron components shall be given the treatment as mentioned in **6** of Part 1.

3 TESTING

3.1 Group of each type of component covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 The critical dimensions of all the components selected as per **3.2** shall be checked for conformance with the relevant figures given in this part.

3.4 Criteria for Conformity

3.4.1 The individual lot of components, as defined in **3.1**, shall be considered conforming to the requirements of the standard, if the batch for the particular lot selected according to **3.2** satisfy the requirements given in **3.4.2**.

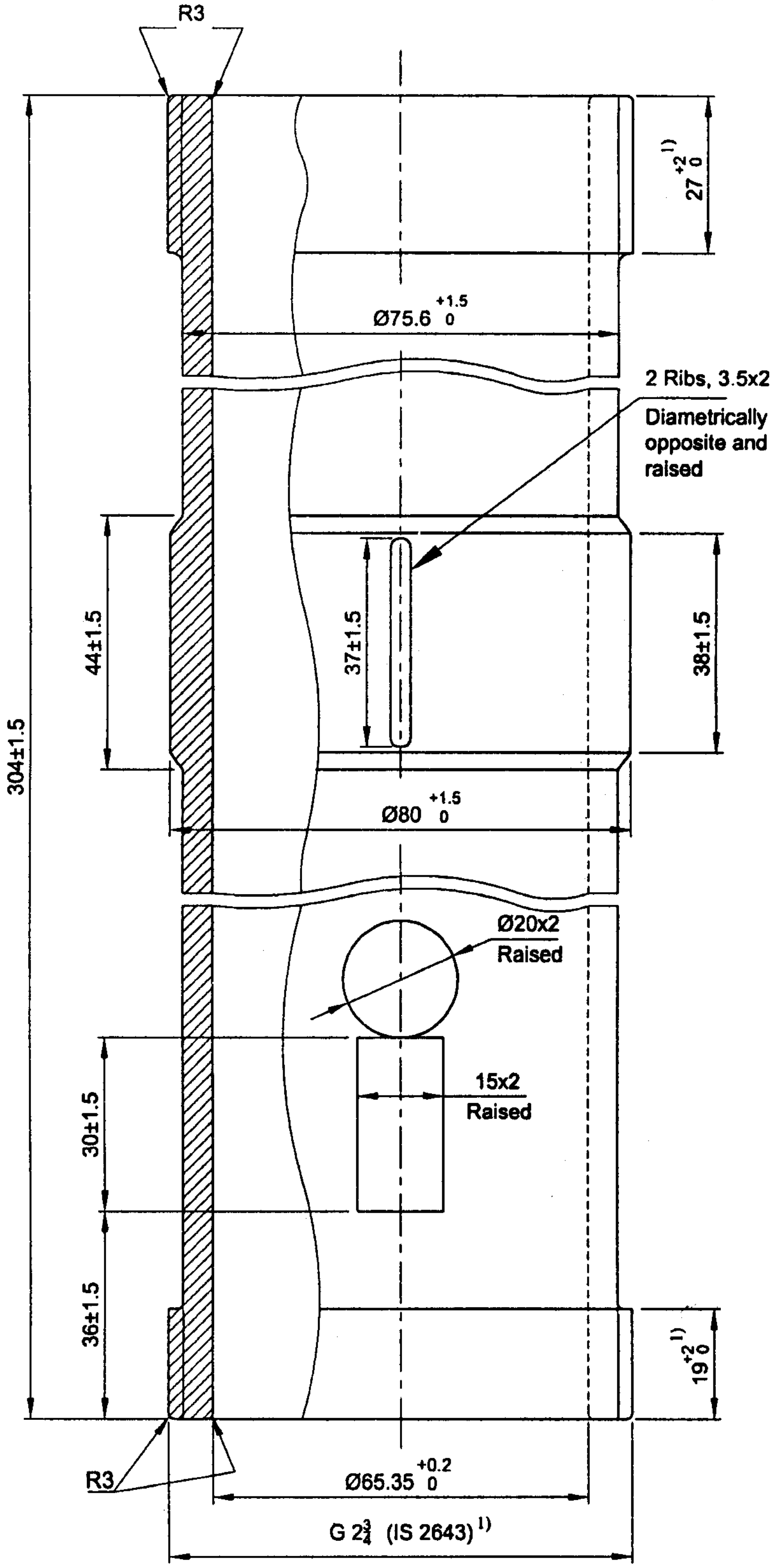
3.4.2 The number of components not meeting the requirements of a characteristic inspected under **3.3** shall not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

4 MARKING

The requirements given in **11.5.3** of Part 1 shall be followed.

5 PACKING

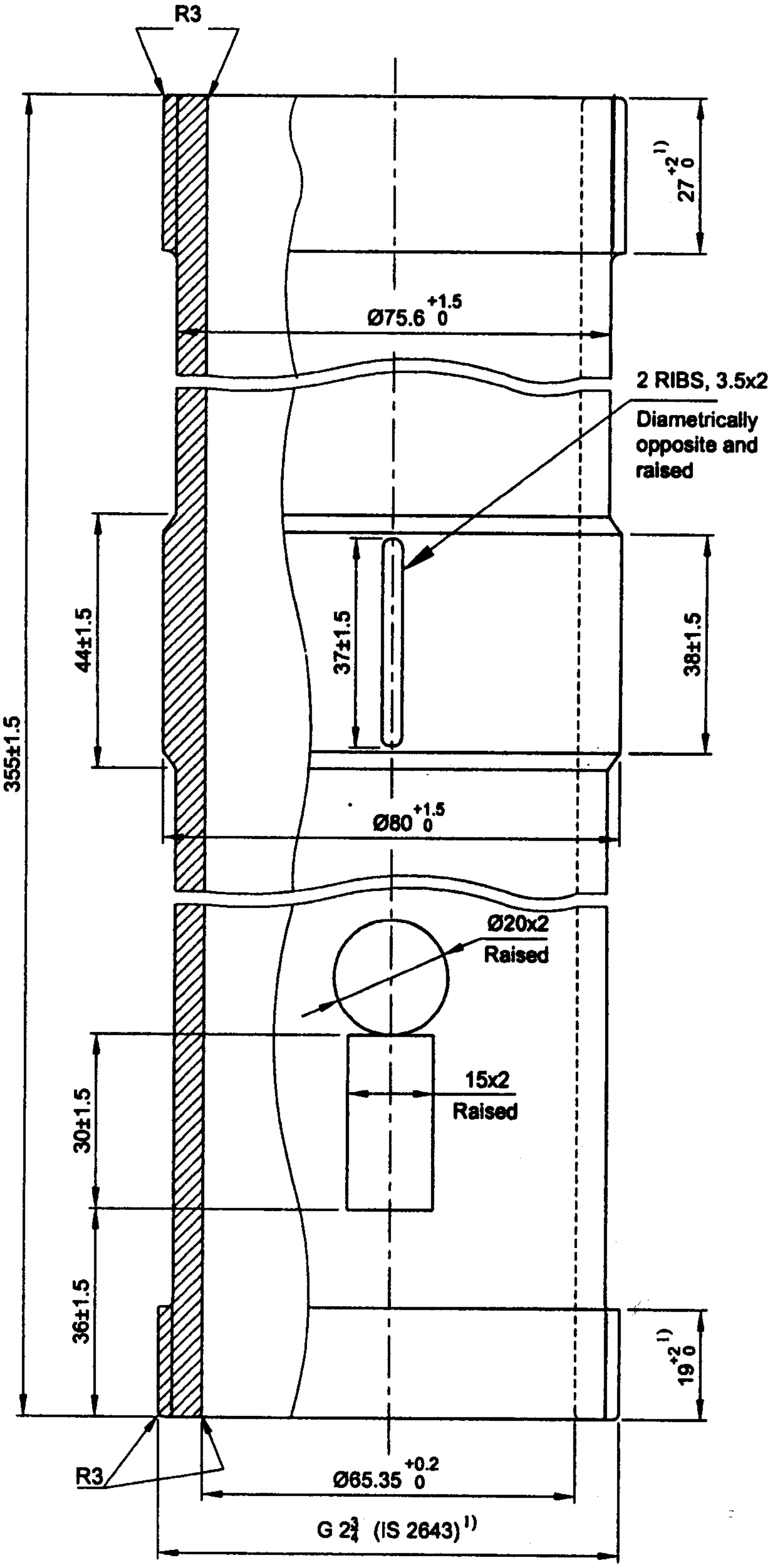
The requirements of **12.1** and **12.2** of Part 1 shall apply.



[1] Indicates critical dimensions.

All dimensions in millimetres.

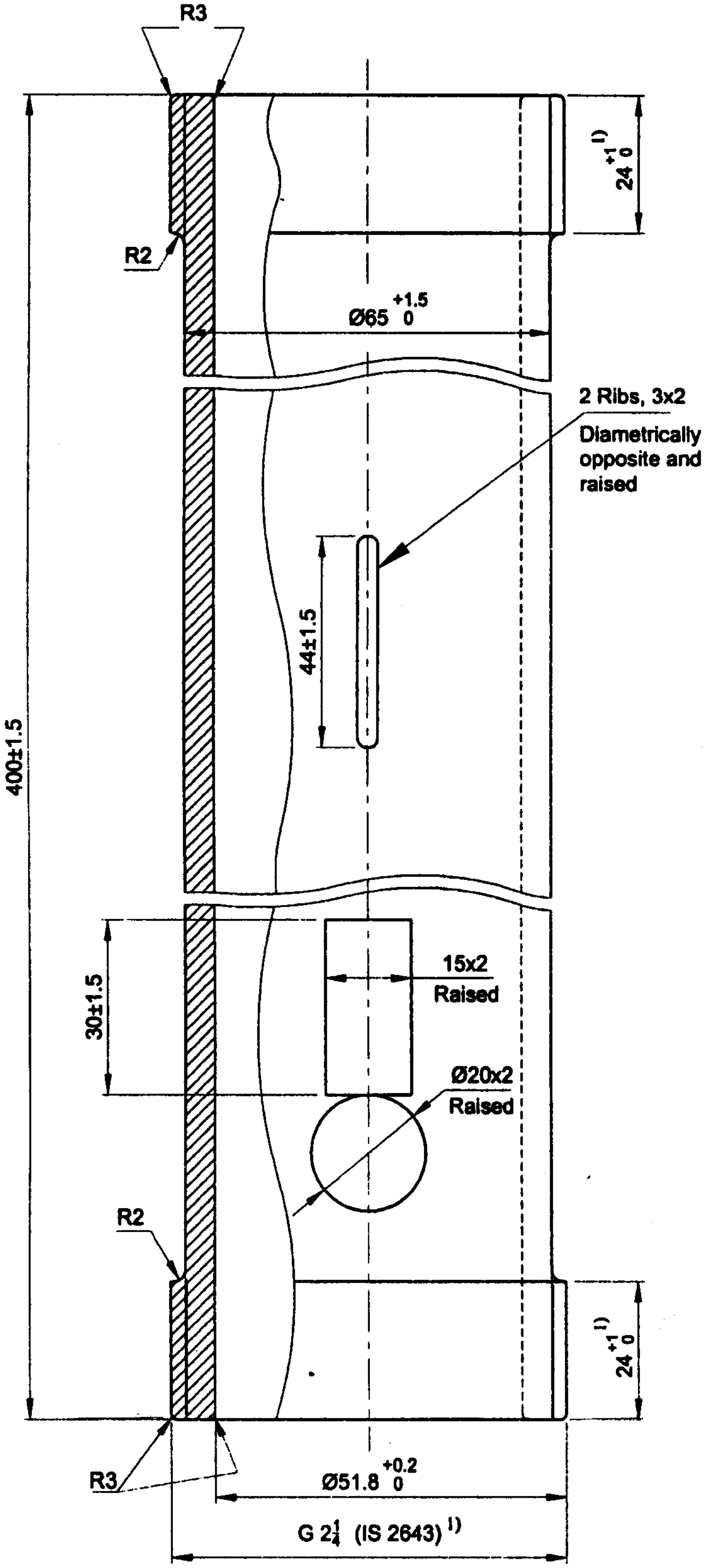
FIG. 5.1 CYLINDER BODY — STANDARD
(For SDWP)



[1] Indicates critical dimensions.

All dimensions in millimetres.

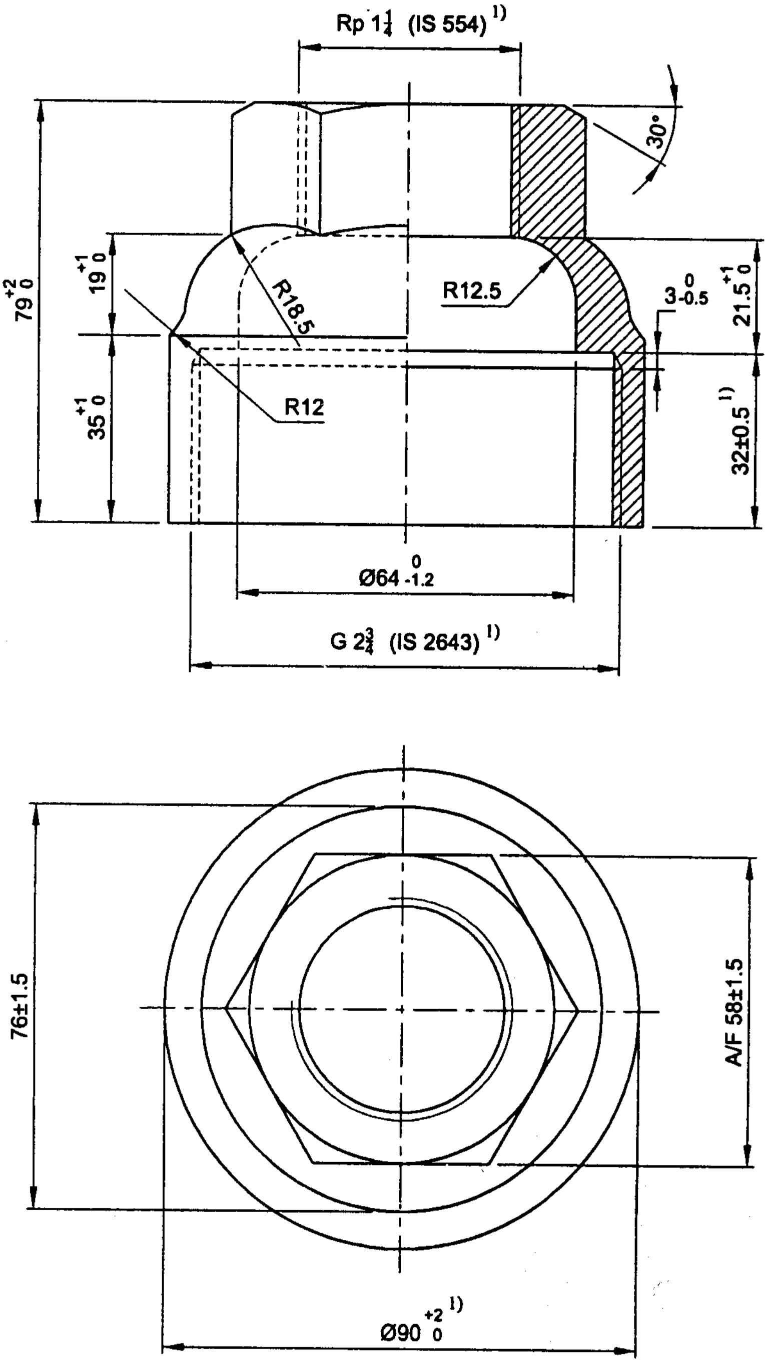
FIG. 5.2 CYLINDER BODY — LONG
(For EDWP & VLOM-65)



[1] Indicates critical dimensions.

All dimensions in millimetres.

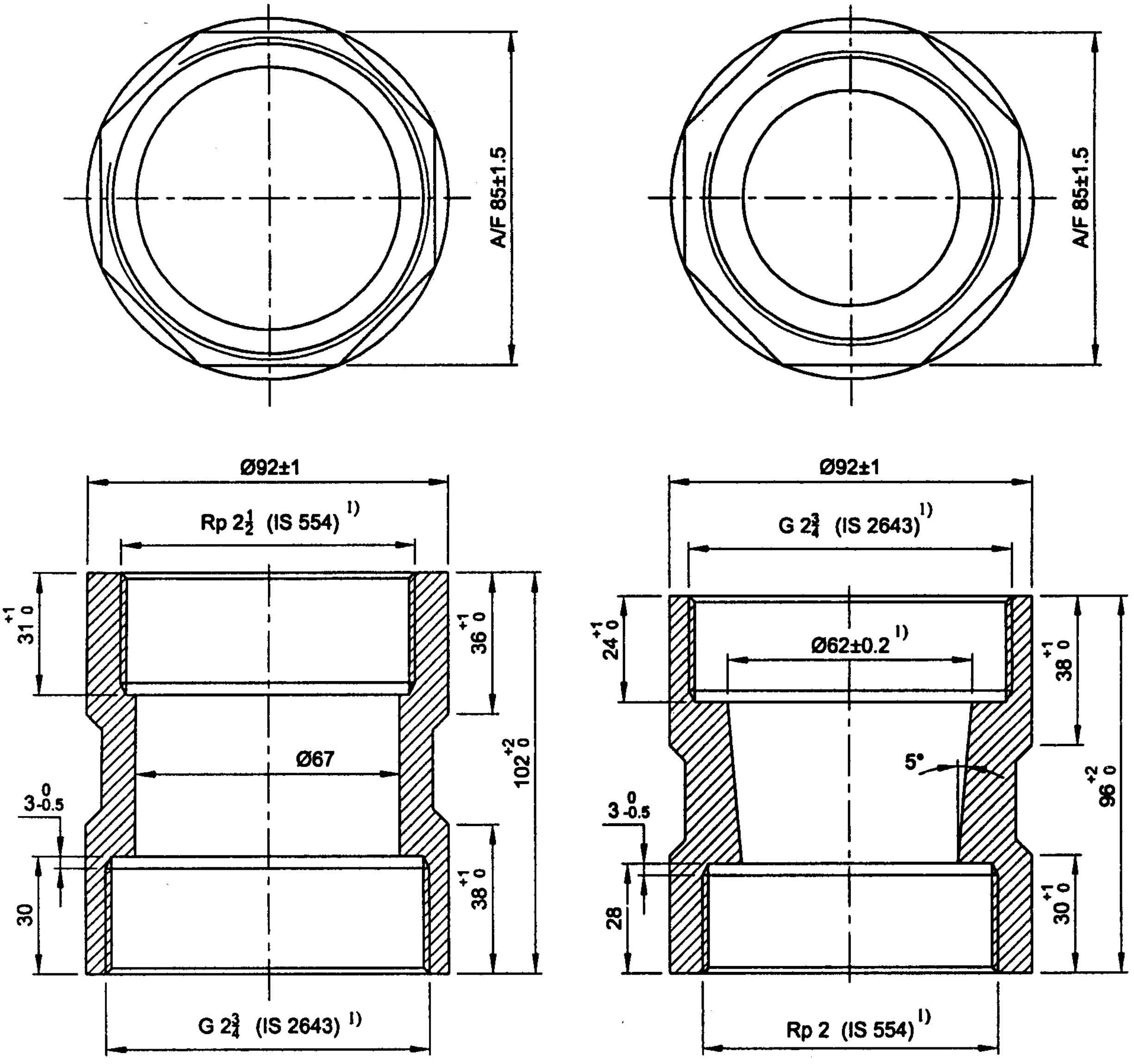
FIG. 5.3 CYLINDER BODY — VLOM-50



[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 5.4 REDUCER CAP
(For SDWP & EDWP)



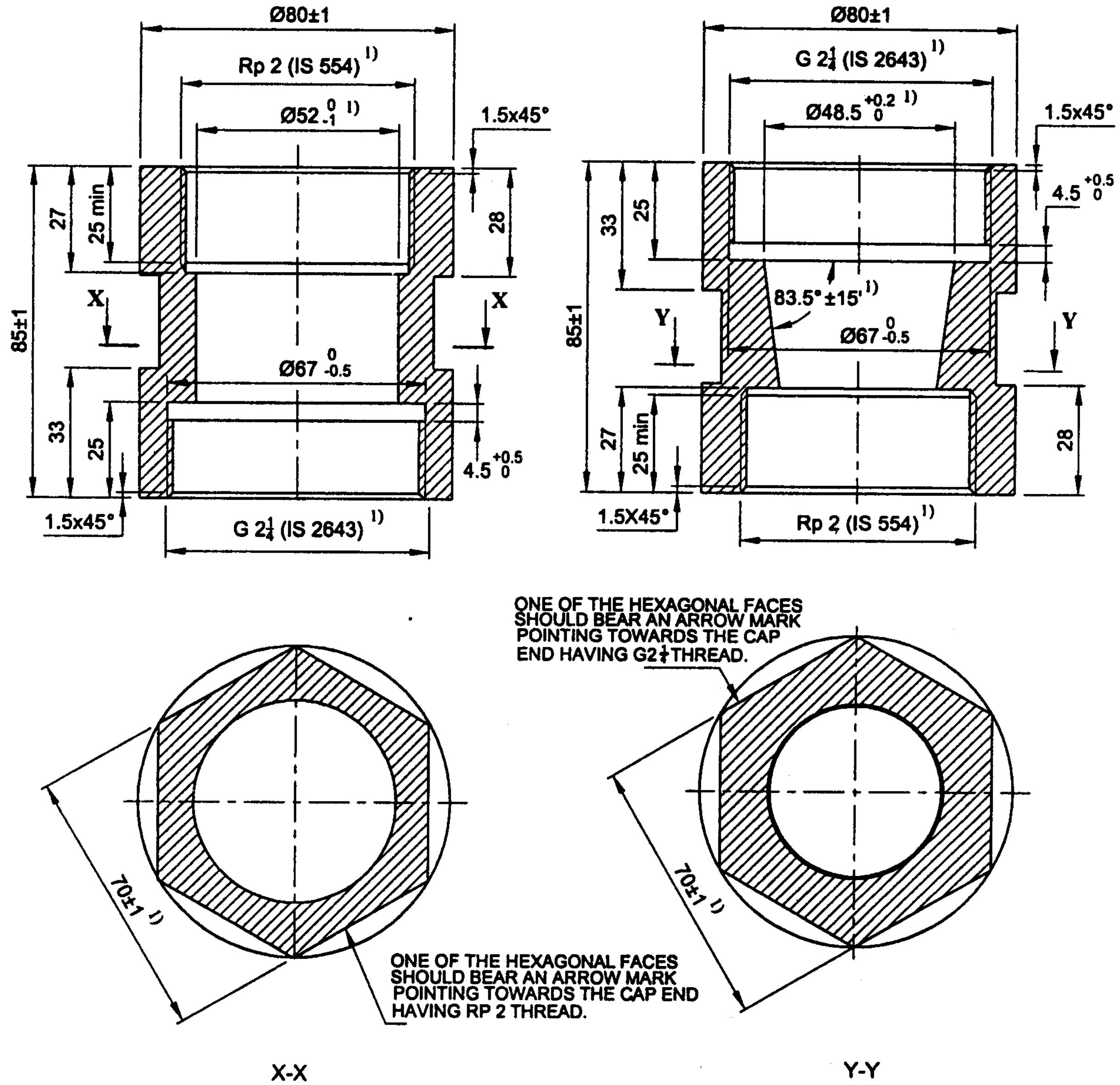
5.5A Upper Cap — VLOM-65

5.5B Bottom Cap — VLOM-65

1) Indicates critical dimensions.

All dimensions in millimetres.

Fig. 5.5 Cylinder Caps — VLOM-65
(For SDWP & EDWP)



ONE OF THE HEXAGONAL FACES SHOULD BEAR AN ARROW MARK POINTING TOWARDS THE CAP END HAVING G2¼ THREAD.

ONE OF THE HEXAGONAL FACES SHOULD BEAR AN ARROW MARK POINTING TOWARDS THE CAP END HAVING RP 2 THREAD.

5.6A Upper Cap — VLOM-50

5.6B Bottom Cap — VLOM-50

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 5.6 CYLINDER CAPS — VLOM-50

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 6 BRASS/BRONZE COMPONENTS

1 SCOPE

1.1 This part specifies the requirements of brass and leaded-tin-bronze components used in the assembly of each type of handpump (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 This part shall be read with Part 1. The stipulations provided therein, whichever relevant to the components covered in this part shall apply.

2 CONSTRUCTION

2.1 The constructional details of different components covered in this part shall be as given in Fig. 6.1 to 6.16.

2.2 The material and dimensions shall meet the related prerequisites given in **4** and **5** of Part 1.

3 TESTING

3.1 Group of each type of component covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 The critical dimensions of all the components selected as per **3.2** shall be checked for conformance with the relevant figures given in this part.

3.4 Criteria for Conformity

3.4.1 The individual lot of components, as defined in **3.1**, shall be considered conforming to the requirements of the standard, if the batch for the particular lot selected according to **3.2** satisfy the requirements given in **3.4.2**.

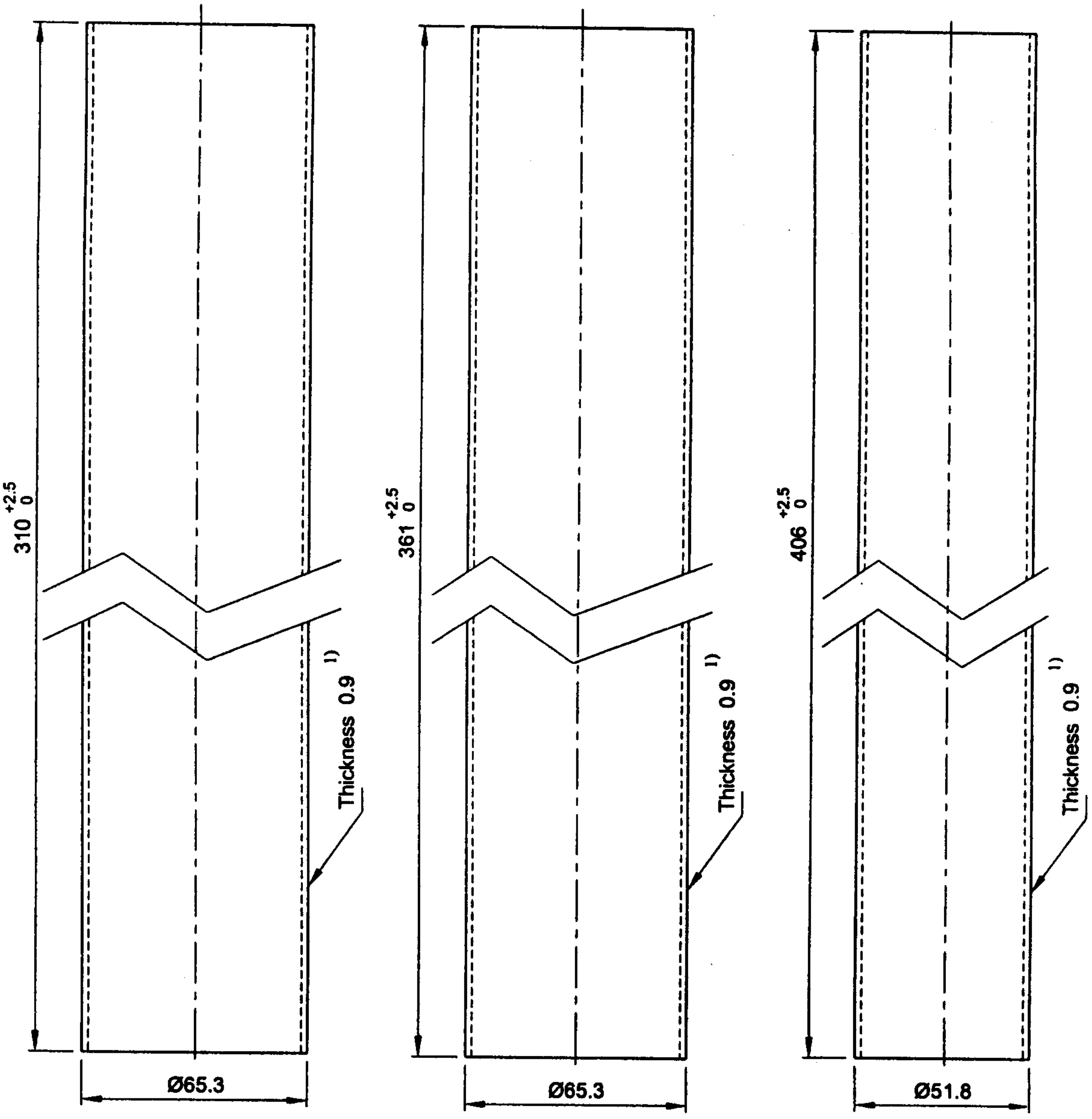
3.4.2 The number of components not meeting the requirements of a characteristic inspected under **3.3** shall not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

4 MARKING

The requirements given in **11.5.4** of Part 1 shall be followed.

5 PACKING

The requirements of **12.1** and **12.2** of Part 1 shall apply.



6.1A Brass Liner — Short
(For SDWP)

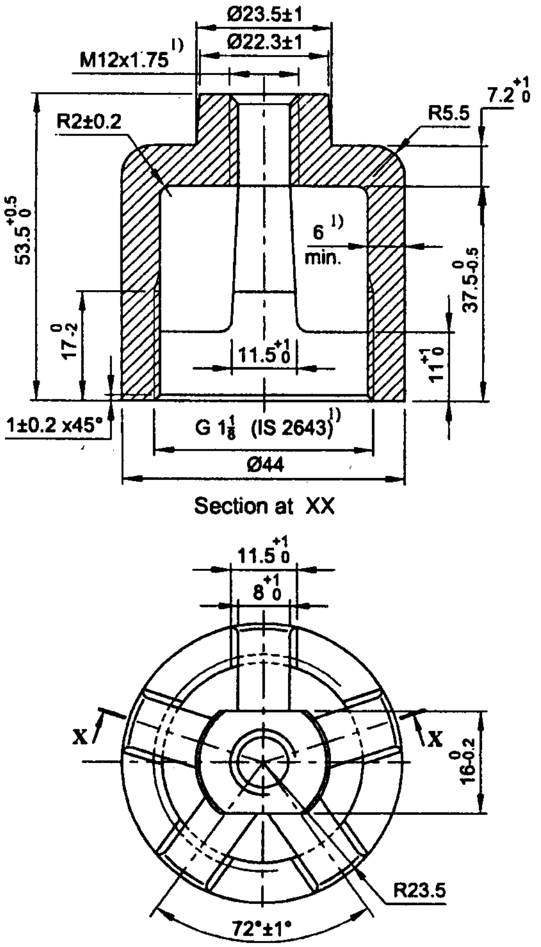
6.1B Brass Liner — Long
(For EDWP & VLOM-65)

6.1C Brass Liner — VLOM-50
(For VLOM-50)

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.1 BRASS LINER

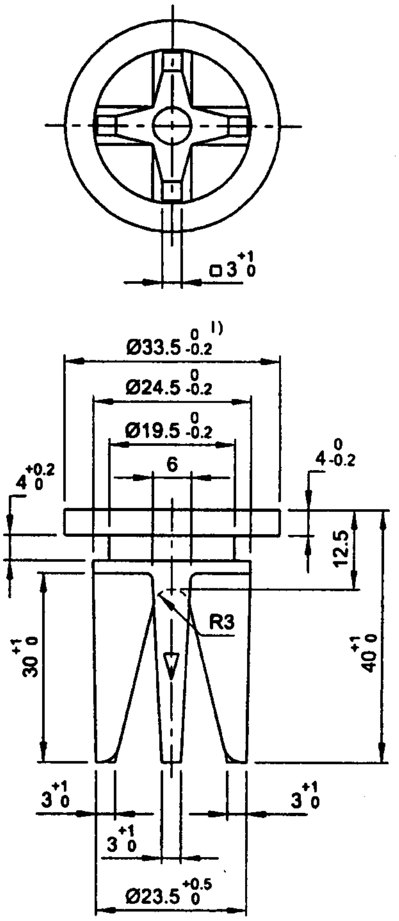


NOTE — Section 18 A/F can be at any location.

[1] Indicates critical dimensions.

All dimensions in millimetres.

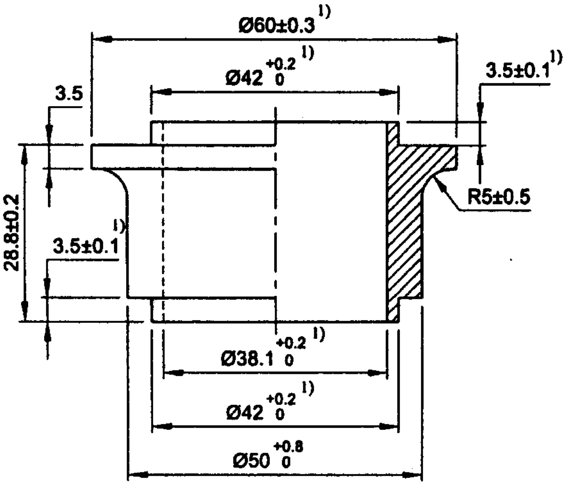
Fig. 6.2 Plunger Yoke Body (For SDWP, EDWP & VLOM-65)



[1] Indicates critical dimensions.

All dimensions in millimetres.

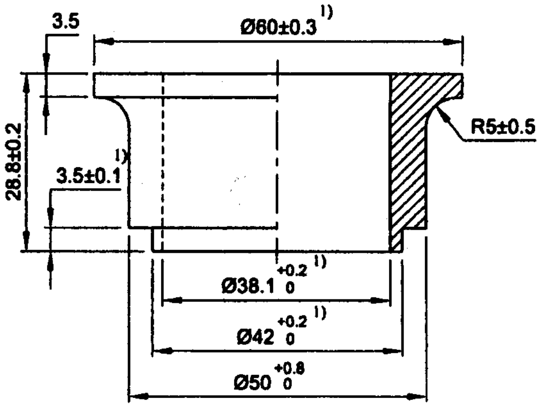
Fig. 6.3 Upper Valve (For SDWP, EDWP & VLOM-65)



[1] Indicates critical dimensions.

All dimensions in millimetres.

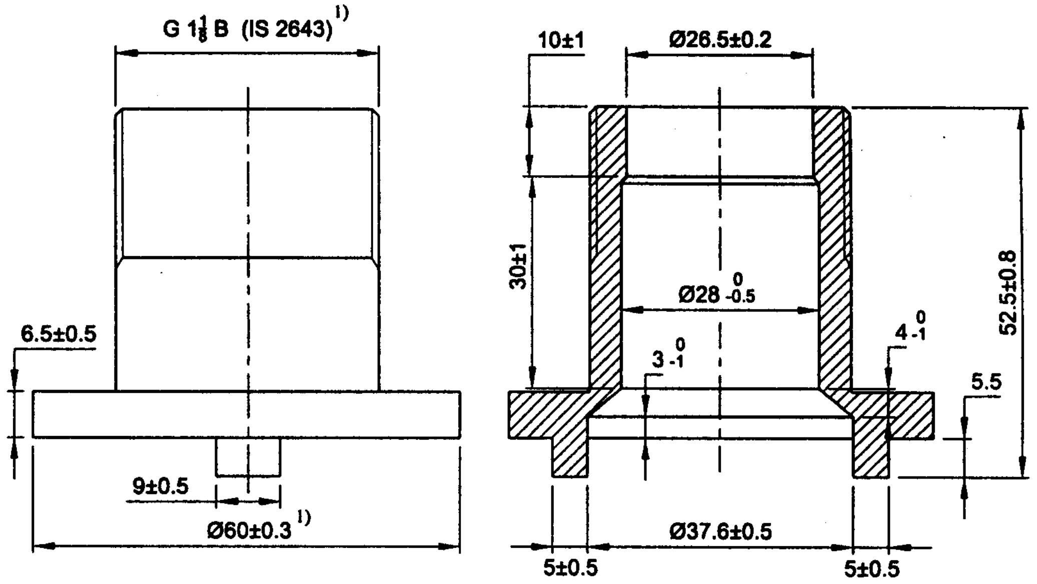
Fig. 6.4 Bucket Spacer — Standard (For SDWP, EDWP & VLOM-65)



[1] Indicates critical dimensions.

All dimensions in millimetres.

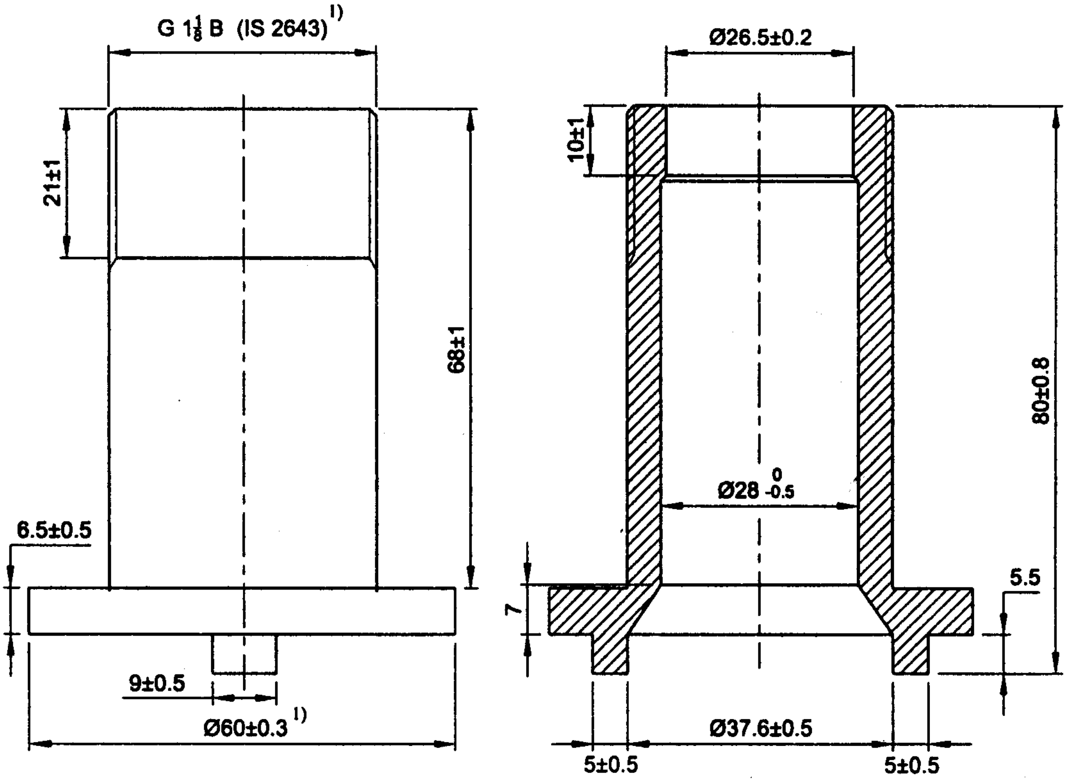
Fig. 6.5 Bucket Spacer — Lower (For EDWP)



[1)] Indicates critical dimensions.

All dimensions in millimetres.

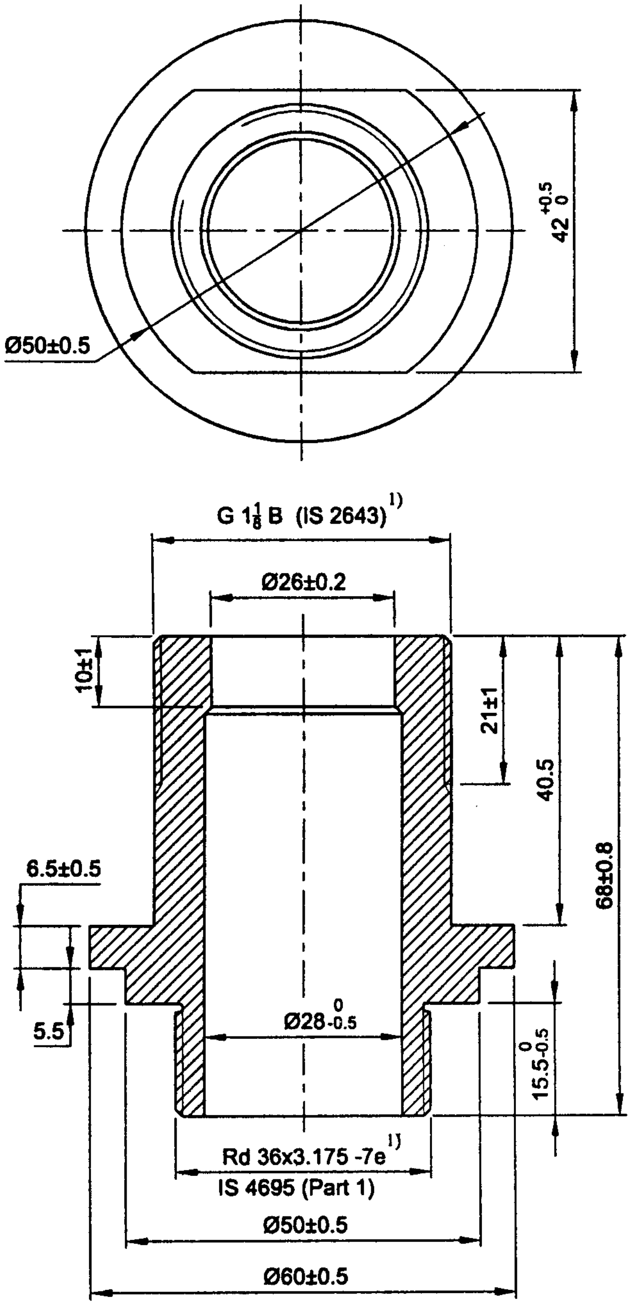
FIG. 6.6 FOLLOWER — SDWP



[1)] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.7 FOLLOWER — EDWP

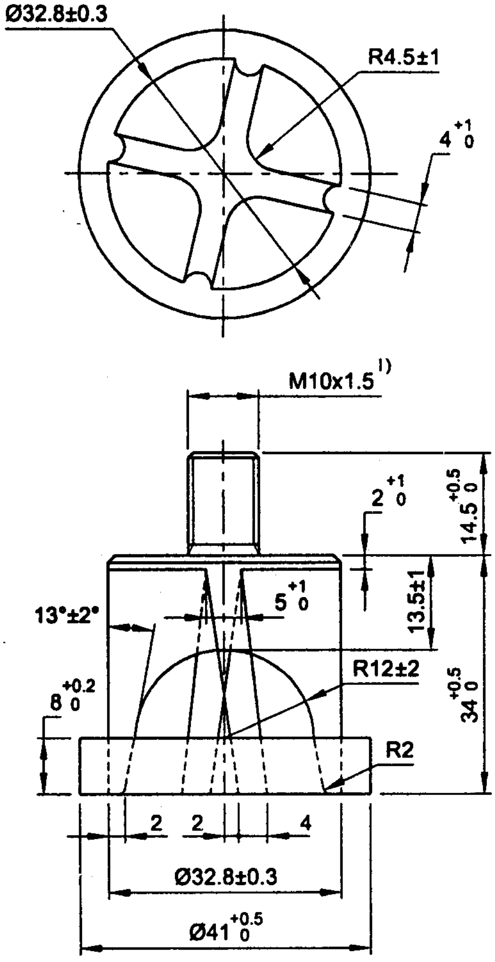


NOTE — 2×45° Chamfer at knuckle thread end and weak thread to be removed.

1) Indicates critical dimensions.

All dimensions in millimetres.

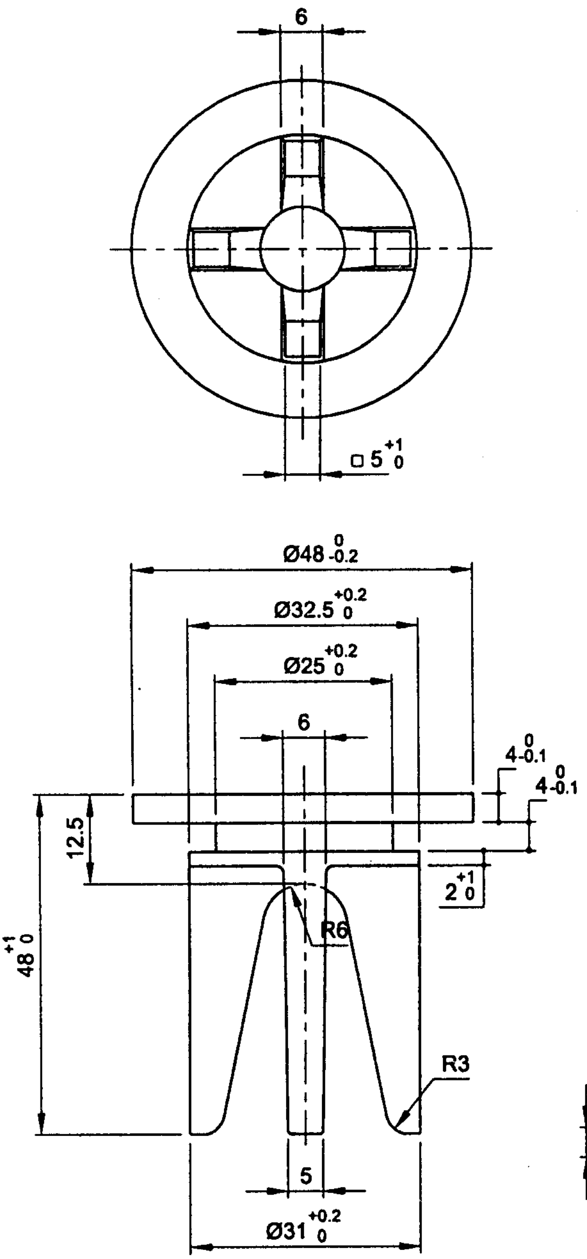
FIG. 6.8 FOLLOWER — VLOM-65



1) Indicates critical dimensions.

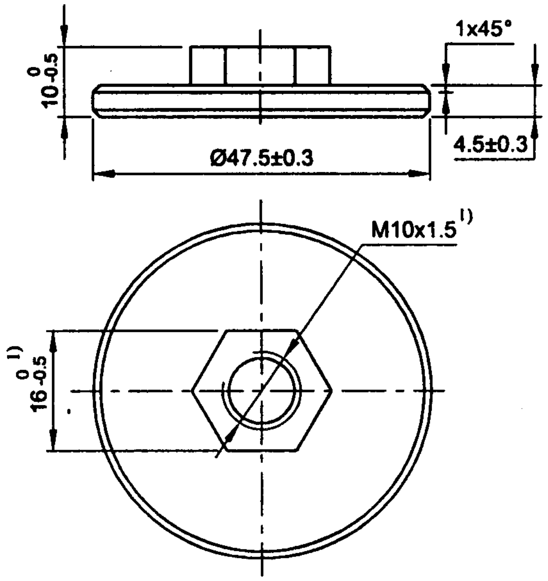
All dimensions in millimetres.

FIG. 6.9 CHECK VALVE — STANDARD (For SDWP & EDWP)



All dimensions in millimetres.

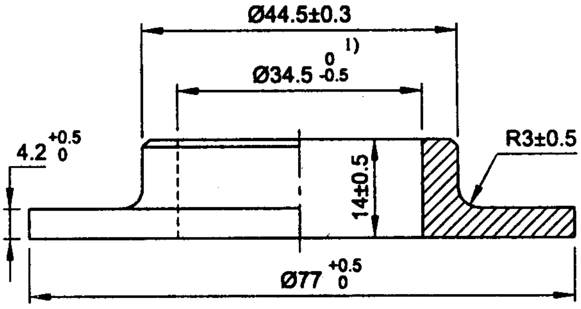
FIG. 6.10 CHECK VALVE — VLOM-65



1) Indicates critical dimensions.

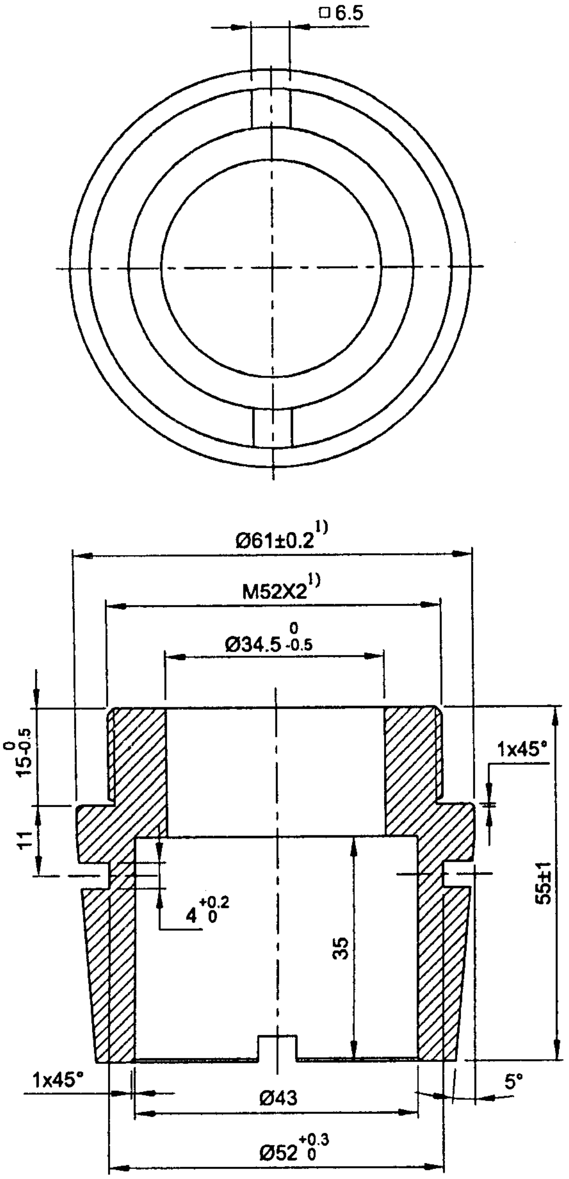
All dimensions in millimetres.

FIG. 6.11 RUBBER SEAT RETAINER
(For SDWP & EDWP)



1) Indicates critical dimensions.
All dimensions in millimetres.

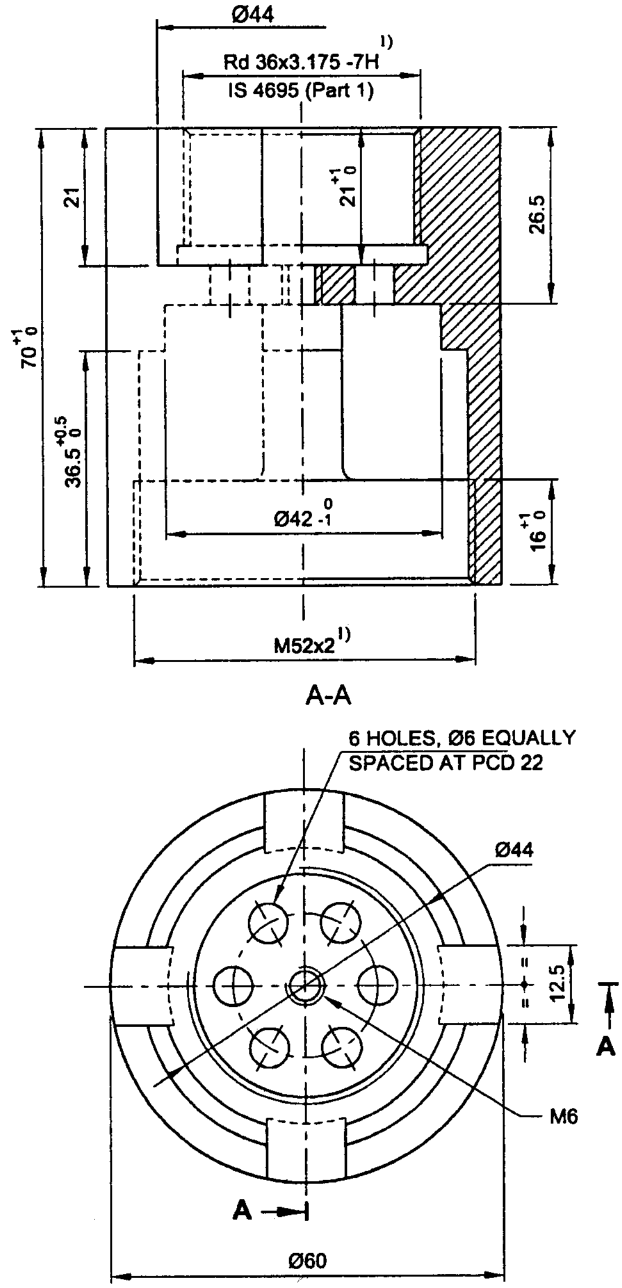
FIG. 6.12 CHECK VALVE SEAT — STANDARD
(For SDWP & EDWP)



[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.13 CHECK VALVE — VLOM-65

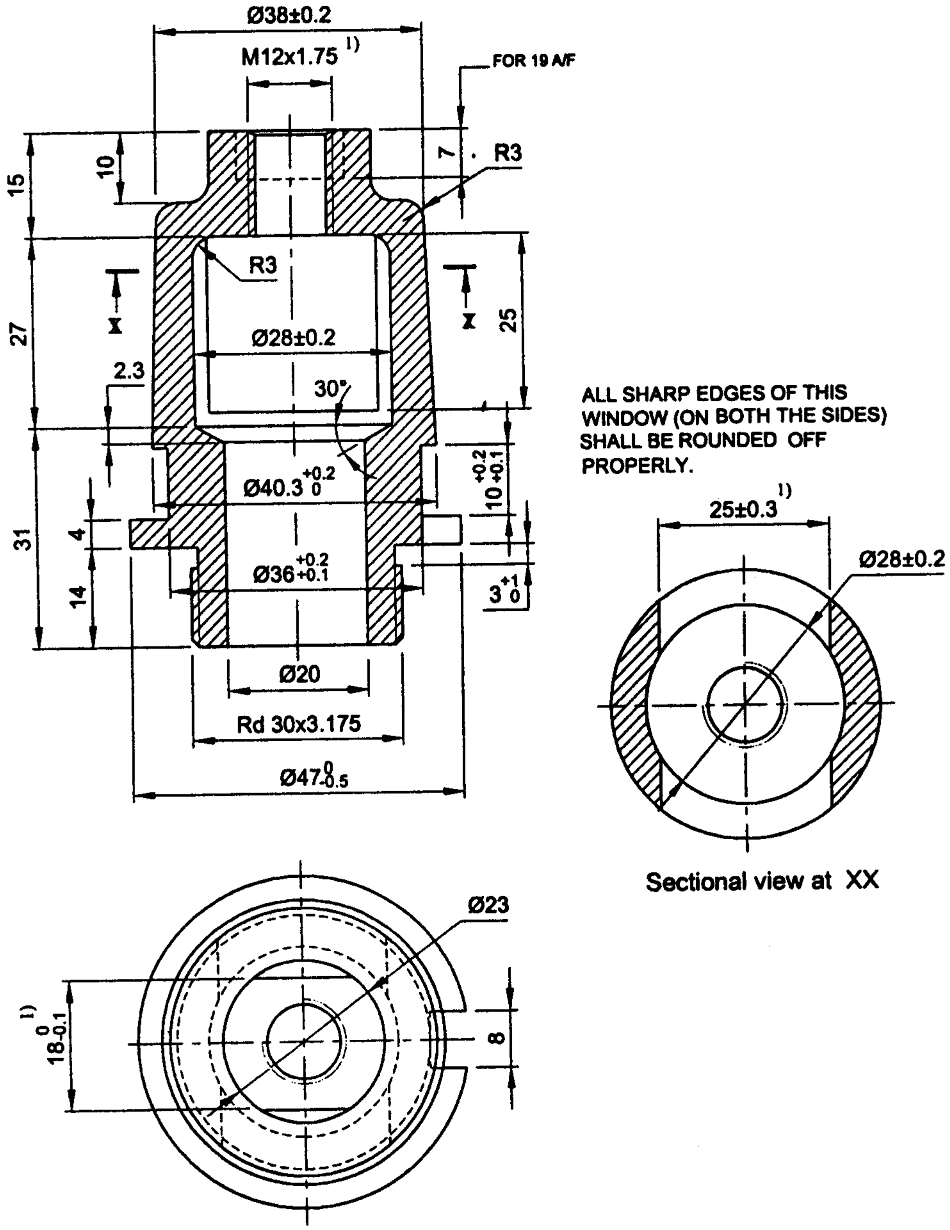


NOTE — 2×45° Chamfer at knucle thread end and weak thread to be removed.

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.14 CAGE
(For VLOM-65)



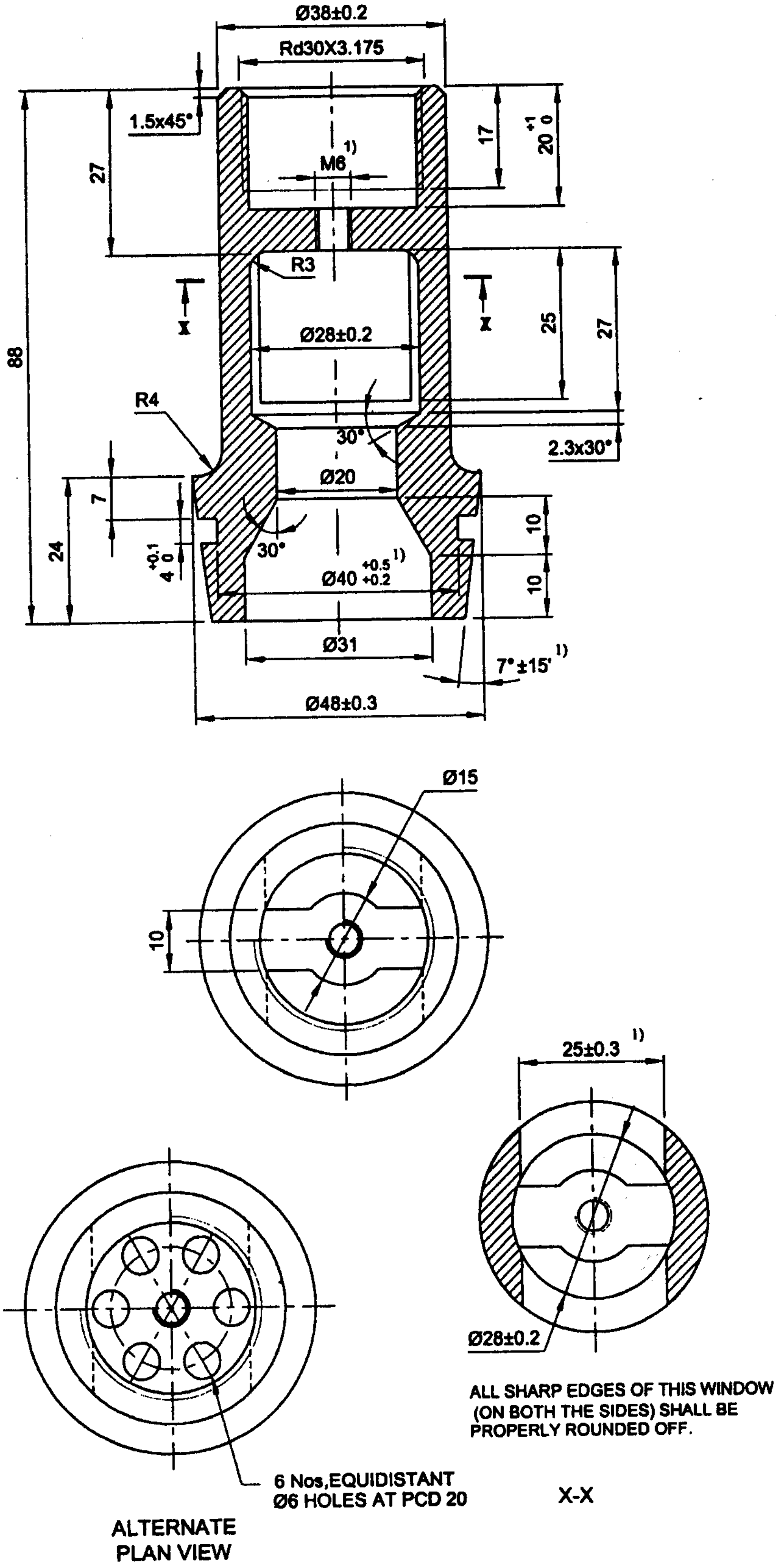
ALL SHARP EDGES OF THIS WINDOW (ON BOTH THE SIDES) SHALL BE ROUNDED OFF PROPERLY.

Sectional view at XX

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.15 PLUNGER VALVE BODY — VLOM-50



ALL SHARP EDGES OF THIS WINDOW (ON BOTH THE SIDES) SHALL BE PROPERLY ROUNDED OFF.

[1] Indicates critical dimensions.

All dimensions in millimetres.

FIG. 6.16 CHECK VALVE BODY — VLOM-50

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 7 RUBBER COMPONENTS

1 SCOPE

1.1 This part specifies the requirements of rubber components used in the assembly of each type of handpump (SDWP, VLOM-65, VLOM-50 and EDWP) covered in this standard.

1.2 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the components covered in this part, shall apply.

2 CONSTRUCTION

2.1 The constructional details of different components covered in this part shall be as given in Fig. 7.1 to 7.15.

2.2 The material and dimensions shall meet the related prerequisites given in **4** and **5** of Part 1.

3 TESTING

3.1 Group of each type of component covered in this part shall be treated as a separate lot.

3.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

3.3 The critical dimensions and hardness of all the components selected as per **3.2** shall be checked for conformance with the relevant figures given in this part.

3.4 Criteria for Conformity

3.4.1 The individual lot of components, as defined in **3.1**, shall be considered conforming to the requirements of the standard, if the batch for the particular lot selected according to **3.2** satisfy the requirements given in **3.4.2**.

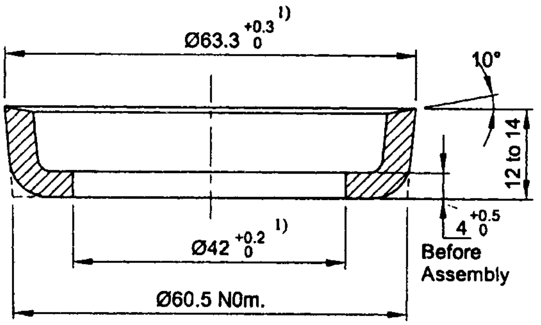
3.4.2 The number of components not meeting the requirements of a characteristic inspected under **3.3** shall not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

4 MARKING

The requirements given in **11.5.5** of Part 1 shall be followed.

5 PACKING

The requirements of **12.1** of Part 1 shall apply.

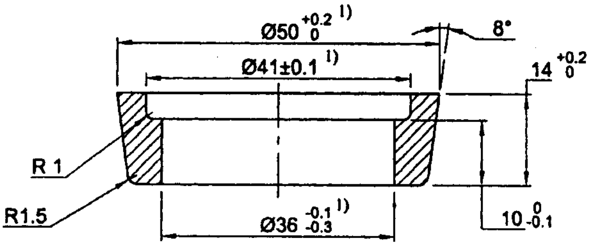


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.1 PUMP BUCKET — STANDARD
(For SDWP, EDWP & VLOM-65)

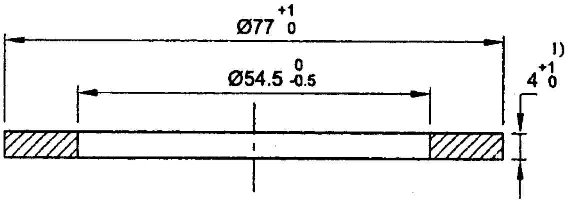


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.2 PUMP BUCKET — VLOM-50

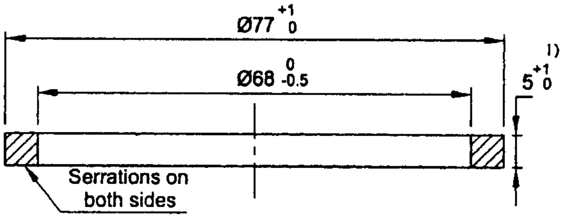


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.3 SEALING RING — STANDARD
(For SDWP & EDWP)

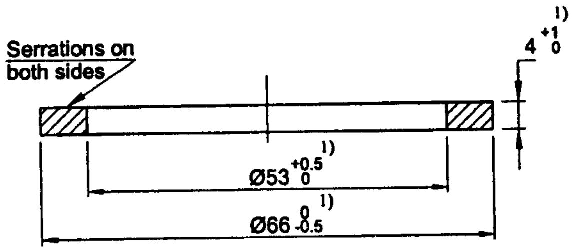


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.4 SEALING RING — VLOM-65

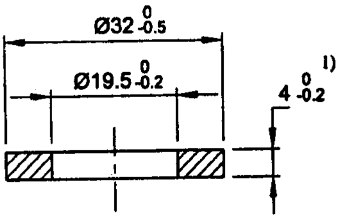


Shore hardness 60^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.5 SEALING RING — VLOM-50

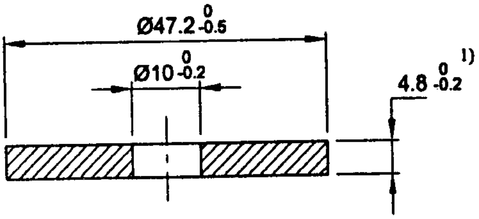


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.6 UPPER VALVE SEATING
(For SDWP, EDWP & VLOM-65)

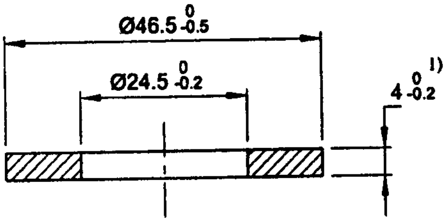


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.7 LOWER VALVE SEATING — STANDARD
(For SDWP & EDWP)

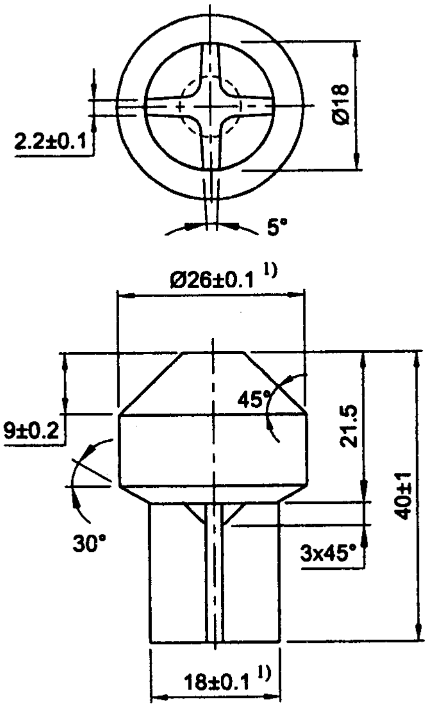


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

FIG. 7.8 LOWER VALVE SEATING — VLOM-65

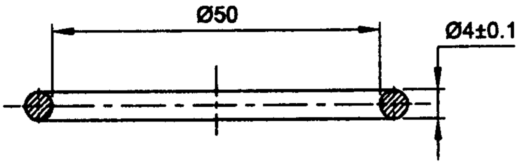


Shore hardness 80^{+5}_{-4} on scale A.

1) Indicates critical dimensions.

All dimensions in millimetres.

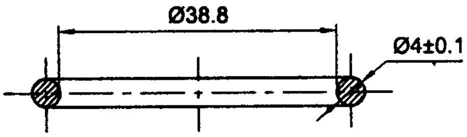
FIG. 7.9 BOBBIN
(For VLOM-50)



Shore hardness 60^{+5}_{-4} on scale A.

All dimensions in millimetres.

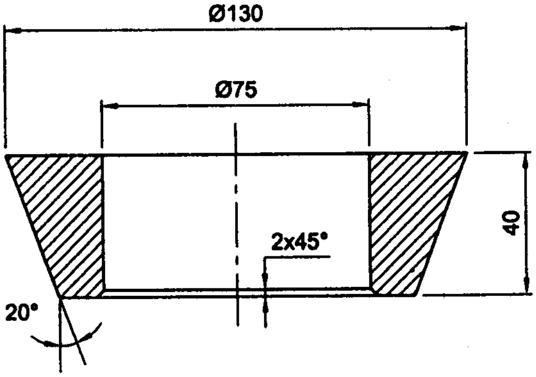
FIG. 7.10 O-RING — VLOM-65



Shore hardness 60^{+5}_{-4} on scale A.

All dimensions in millimetres.

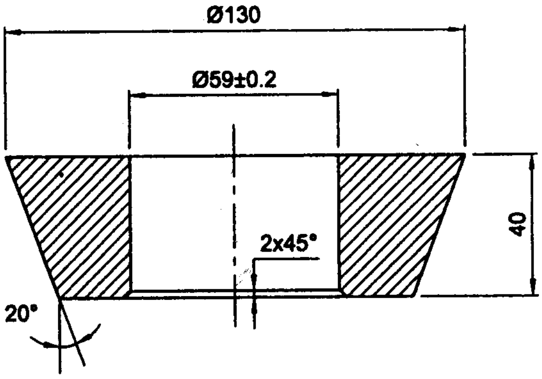
FIG. 7.11 O-RING — VLOM-50



Shore hardness 80^{+5}_{-4} on scale A.

All dimensions in millimetres.

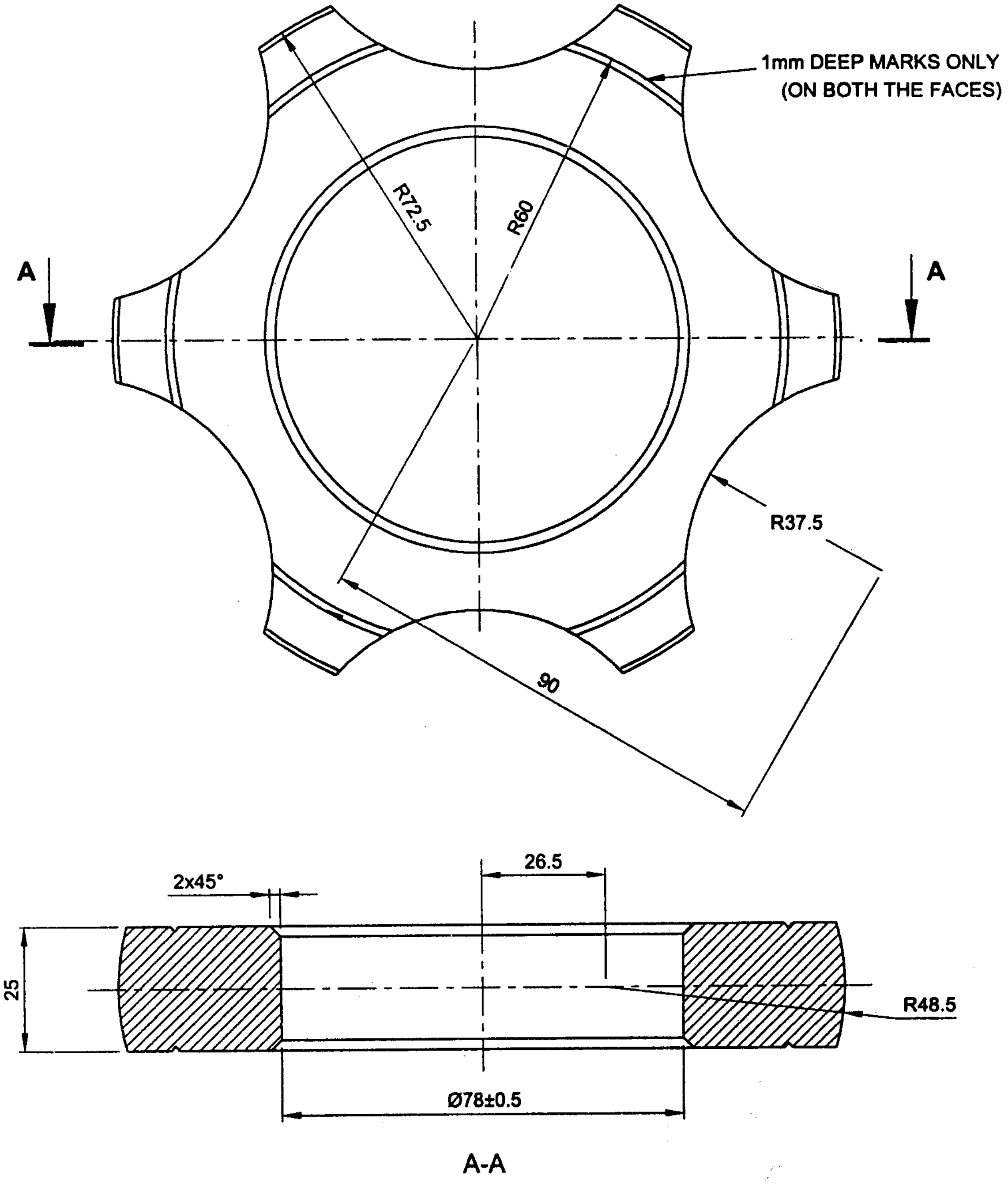
FIG. 7.12 RUBBER CONE — VLOM-65



Shore hardness 80^{+5}_{-4} on scale A.

All dimensions in millimetres.

FIG. 7.13 RUBBER CONE — VLOM-50



NOTES

1 Only one centralizer to be provided resting against first pipe-joint from the top.

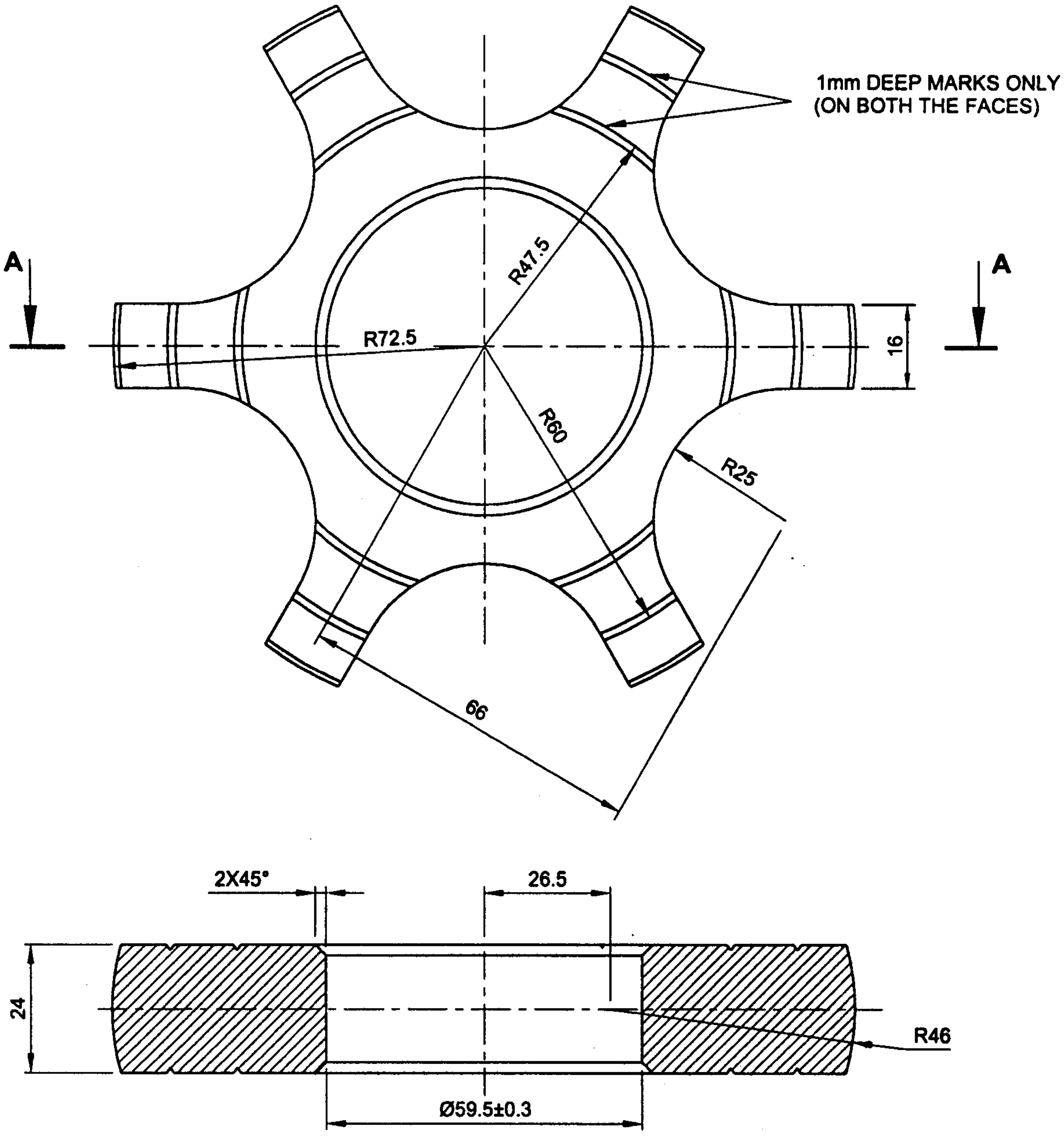
2 The above centralizer is suitable for 150 NB casing pipe. It may be trimmed at R60 marks for use with 125 NB casing pipe.

Shore hardness 80^{+5}_{-4} on scale A.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

FIG. 7.14 PIPE CENTRALIZER — VLOM-65



A-A

NOTES

1 Only one centralizer to be provided resting against first pipe-joint from the top.

2 The above centralizer is suitable for 150 NB casing pipe. It may be trimmed at R60 and R47.5 marks for use with casing pipe of 125 and 100 NB respectively.

Shore hardness 80^{+5}_{-4} on scale A.

Manufacturing tolerance to be ±0.5 unless otherwise specified.

All dimensions in millimetres.

Fig. 7.15 Pipe Centralizer — VLOM-50

Indian Standard

DEEPWELL HANDPUMPS, COMPONENTS AND SPECIAL TOOLS — SPECIFICATION

PART 8 SPECIAL TOOLS

1 SCOPE

1.1 This part specifies the requirements of special tools for use in installation and maintenance of handpumps covered in this standard.

1.2 The tools have been arranged in three groups:

a) *Group* 1 : (Fig. 8.1.1 to 8.1.10)
Tools common for all the handpumps.

b) *Group* 2 : (Fig. 8.2.1 to 8.2.8)
Tools specific to SDWP and EDWP.

c) *Group* 3 : (Fig. 8.3.1 to 8.3.7)
Tools specific to VLOM-50 and VLOM-65.

1.3 The quantity of different tools, with the reference of their respective figures, comprising each set of special tools required for installation and/or maintenance of a particular type of handpump is listed in Annex D.

1.4 Heavy-duty clamp and self-locking clamp covered in group 2 are suited up to 45 m depth application. Alternate pipe clamp arrangements may be used for application beyond 45 m.

1.5 This part shall be read with Part 1. Stipulations provided therein, whichever relevant to the special tools covered in this part, shall apply.

2 NOMENCLATURE

2.1 Water Tank Lifter

Required for the handling of the water tank during assembly and dismantling of the pump.

2.2 Pipe Lifting Spanner

Required for lifting or lowering riser pipes.

2.3 Axle Punch

Required to drive the handle axle out of the head assembly.

2.4 Crank Spanner

Required for fastening of M12 and M10 bolts and nuts specially the chain bolt.

2.5 Connecting Rod Lifter

Required to facilitate lowering or lifting of the connecting rods.

2.6 Bearing Pressing Tool

Required for pressing the bearings in the bearing housing.

2.7 Chain Coupling Supporting Tool

Required to facilitate the disconnection of the chain from the handle.

2.8 Rod Coupler Spanner

Required for easy fitment of the connecting rods.

2.9 Heavy Duty Clamp

Required for clamping the riser pipe. It works on sliding jaw system.

2.10 Self-Locking Clamp

An alternate arrangement for clamping of the riser pipe. It grips the pipe as soon as its handle is released.

2.11 Connecting Rod Vice

Required to clamp the connecting rod.

2.12 Check Valve Puller

Required to facilitate extraction of the check valve in VLOM handpump.

2.13 Tool Box

A steel box to keep all above tools except the ones under serial **2.1**, **2.2**, **2.9** and **2.10**.

3 CONSTRUCTION

3.1 The constructional details of different tools covered in this part shall be as given in Fig. 8.1.1 to 8.1.10, Fig. 8.2.1 to 8.2.8 and Fig. 8.3.1 to 8.3.7.

3.2 The material and dimensions shall meet the related prerequisites given in **4** and **5** of Part 1.

3.3 The tool box shall be made of 1 mm nominal thick CRCA steel sheet (*see* IS 513), with the overall dimensions given below:

Length	440 mm
Width	320 mm
Height	110 mm

3.3.1 The hinged lid shall be provided with suitable arrangement for putting a lock.

4 ANTI-CORROSIVE TREATMENT

4.1 Electrogalvanizing

Unless otherwise specified, all the tools and components thereof, except the axle pin (Fig. 8.2.7C) and the spring (Fig. 8.2.7F), shall be electroplated as per service grade No. 3 of IS 1573 and passivated in accordance with IS 9839. Bolts and nuts shall be electroplated in conformance with IS 1367 (Part 11).

4.2 Painting

4.2.1 All the internal surfaces, where electrogalvanizing is not possible, shall be protected with a coat of red oxide primer conforming to IS 2074.

4.2.2 The box shall be given the following anti-corrosive treatment:

a) One coat of red oxide primer conforming to IS 2074.
b) Two coats of synthetic enamel paint conforming to IS 2932.

5 TESTING

5.1 For the purpose of testing, group of each type of tool covered in this part shall be treated as a separate lot.

5.2 Test samples shall be drawn as per procedure described in **9.3** of Part 1.

5.3 The tools selected as per **5.2** shall be subjected to the following checks:

5.3.1 All the tools shall be examined for finish, workmanship and visual defects.

5.3.2 The base plates of the clamps and/or vice shall be reasonably flat to provide proper matching of holes to ensure unrestricted insertion of bolts when fitted on respective flanges of the handpump.

5.3.3 The movement of the screws of the heavy duty clamp and the connecting rod vice shall be easy without undue slackness or resistance throughout the opening. Proper alignment of their jaws shall be ensured.

5.3.4 In case of the self-locking clamp:

a) The jaws shall have free movement when operated with handle and shall close instantly when handle is released,
b) The handle shall not have excessive play both in vertical and horizontal direction when checked before application of force to open the jaws,
c) The jaws should be properly aligned to provide proper and firm gripping of the pipe, and
d) One clamp, after fixing suitably, shall be operated at least 100 times. The difference in length of the spring measured before and after the test shall not be more than 0.5 mm.

5.3.5 In case of the connecting rod vice:

a) The gap between the locking block and the fixed block to be checked for dimension. It shall be centrally placed with respect to the slot in the base plate, and
b) The lock plate shall have free movement.

5.3.6 Two samples out of the batch selected shall be checked for dimensional and other requirements given in respective figures.

5.3.6.1 In case of assembly, all the components shall be dismantled and tested likewise.

5.3.7 *Clamping Test*

5.3.7.1 For the testing of the heavy duty clamp and the self-locking clamp, a solid or hollow mandrel of suitable length having following outer diameter and smooth surface shall be gripped in the jaws. An axial load of 500 kgf shall be applied on the mandrel by suitable arrangement. The mandrel shall not slip.

Mandrel size

For 32 mm pipe clamp : 42 mm outer dia.
For 50 mm pipe clamp : 60 mm outer dia.
For 65 mm pipe clamp : 75 mm outer dia.

5.3.7.2 A similar test shall be done on the connecting rod vice by using 12 mm diameter drawn bar and a load of 200 kgf. There shall be no slippage of the bar.

5.4 Criteria for Conformity

5.4.1 The individual lot of components, as defined in **5.1**, shall be considered conforming to the requirements of the standard, if the batch for the particular lot selected according to **5.2** satisfies the requirements given in **5.4.2**.

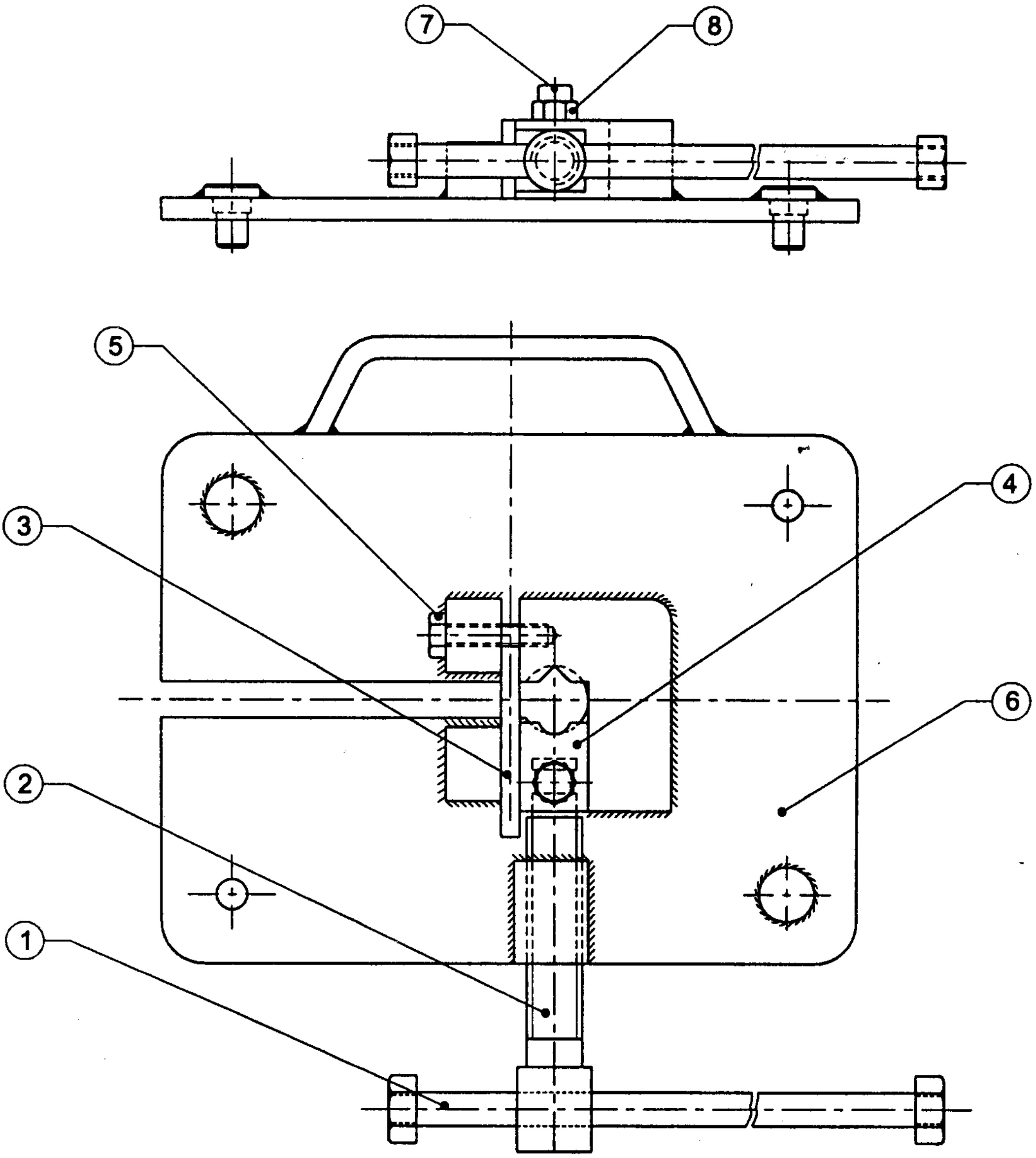
5.4.2 The number of tools not meeting the requirements of the characteristics inspected under **5.3** does not exceed the corresponding acceptance number as specified in IS 2500 (Part 1).

6 MARKING

Each tool shall have clear and legible steel punch impression of manufacturer's identification mark.

7 PACKING

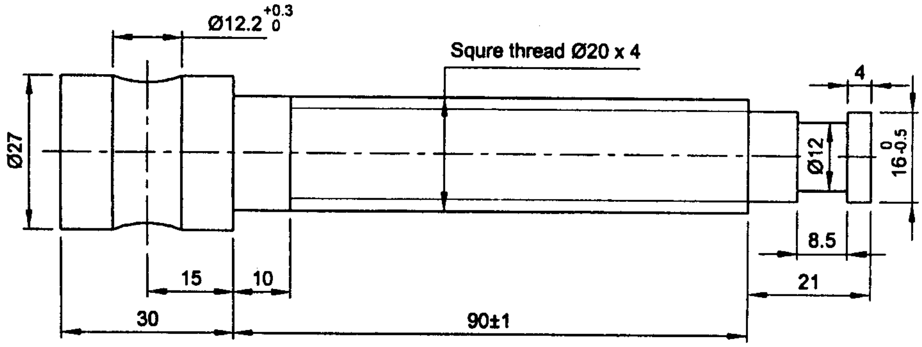
As agreed to between the supplier and the purchaser.



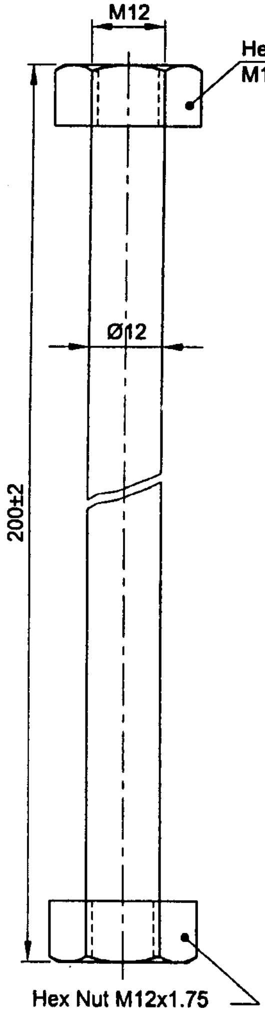
Part No.	No. Off	Description	Reference	Material	
8	1	Locking Nut M8	Std 02	Steel	IS 1363 (Part 3)
7	1	Hex Bolt M8 × 20	Std 06	Steel	IS 1363 (Part 1)
6	1	Rod Vice Base Assembly	Fig. 8.1.2F	Mild Steel	Grade A of IS 2062
5	1	Special Bolt M8 × 40	Fig. 8.1.2E	Mild Steel	Grade A of IS 2062
4	1	Movable Jaw	Fig. 8.1.2D	Mild Steel	Grade A of IS 2062
3	1	Locking Plate	Fig. 8.1.2C	Mild Steel	Grade A of IS 2062
2	1	Threaded Shaft	Fig. 8.1.2B	Mild Steel	Grade A of IS 2062
1	1	Handle	Fig. 8.1.2A	Mild Steel	Grade A of IS 2062

All dimensions in millimetres.

FIG. 8.1.1 CONNECTING ROD VICE

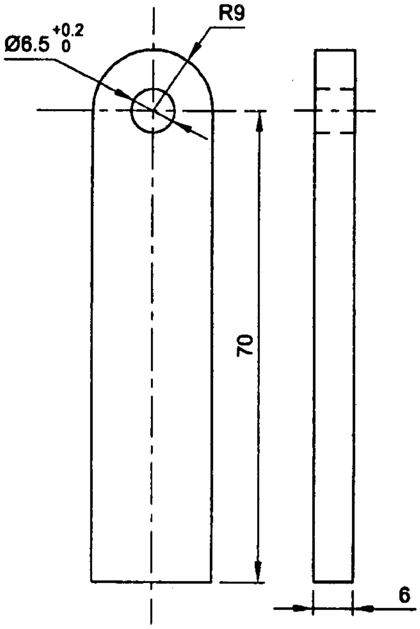


8.1.2B Threaded Shaft

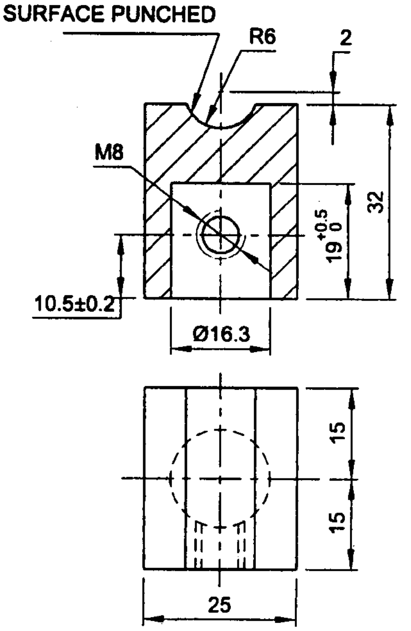


SEAL WELD NUT AT ONE END AND
OTHER END PUNCH LOCKED AFTER
TIGHTENING THE NUT FULLY WHEN
ASSEMBLED IN VICE.

8.1.2A Handle

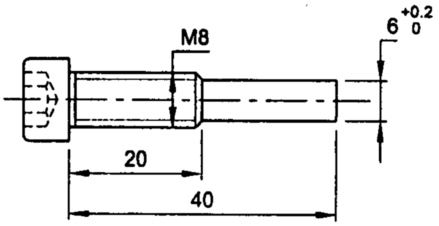


8.1.2C Locking Plate



CARBURISE AND HARDENED
TO 40 TO 45 HRC

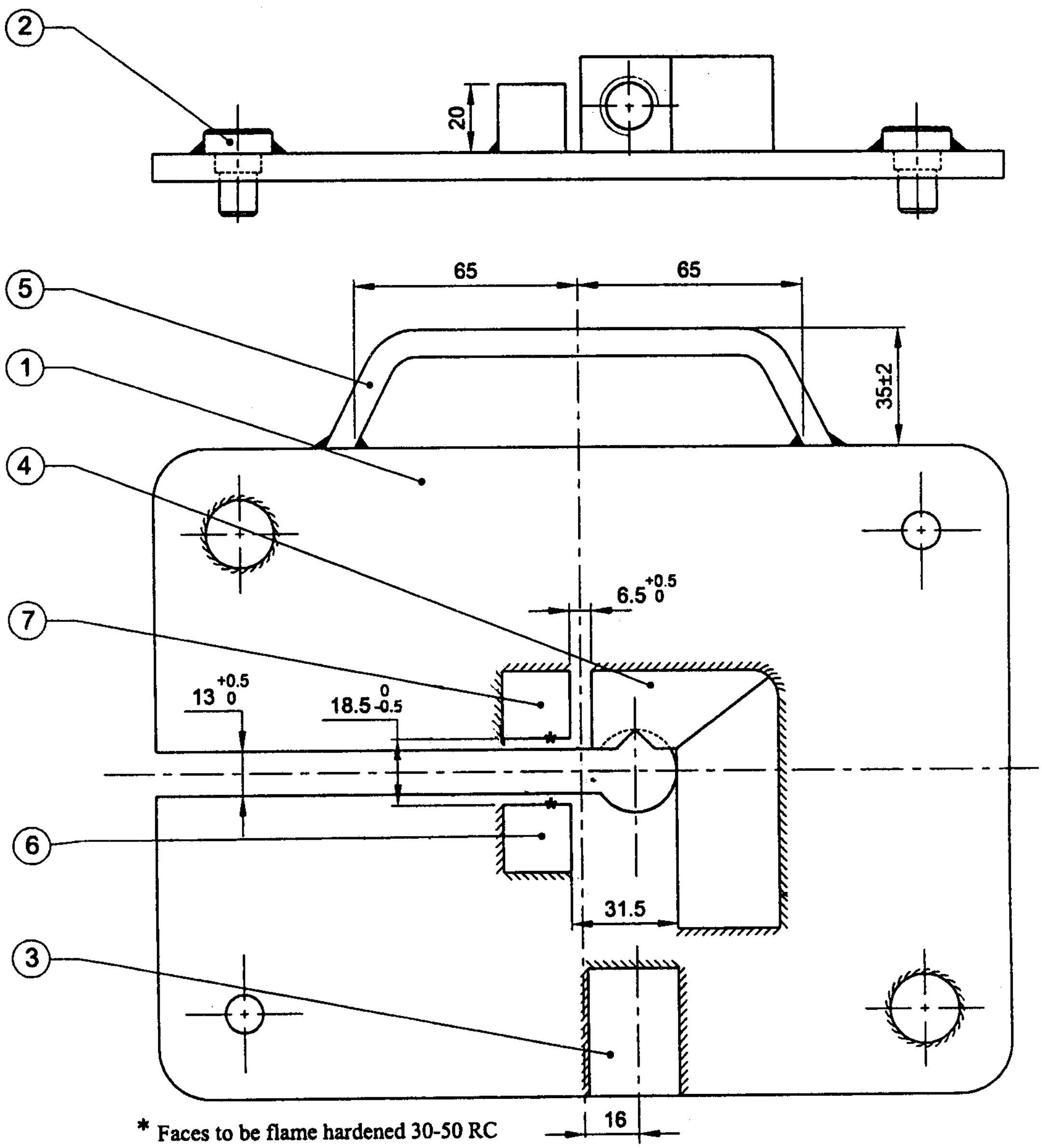
8.1.2D Movable Jaw



8.1.2E Special Bolt

All dimensions in millimetres.

Fig. 8.1.2 Rod Vice Parts (*Continued*)



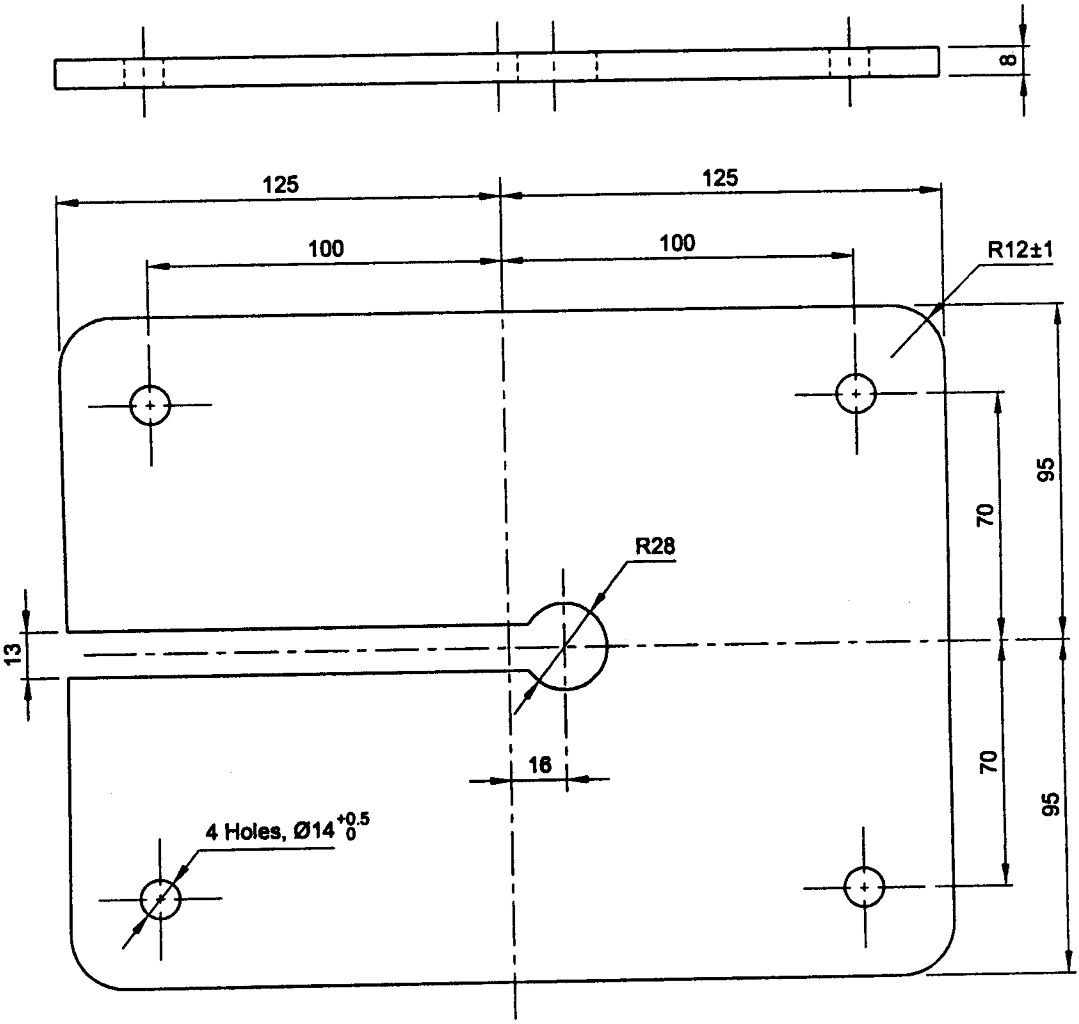
* Faces to be flame hardened 30-50 RC

Part No.	No. Off	Description	Reference	Material	
7	1	Locking Block	Fig. 8.1.3G	Mild Steel	Grade A of IS 2062
6	1	Fixed Block	Fig. 8.1.3F	Mild Steel	Grade A of IS 2062
5	1	Carrying Handle	Fig. 8.1.3E	Mild Steel	Grade A of IS 2062
4	1	Supporting Block	Fig. 8.1.3D	Mild Steel	Grade A of IS 2062
3	1	Fixed Nut	Fig. 8.1.3C	Mild Steel	Grade A of IS 2062
2	2	Base Plate Lug	Fig. 8.1.3B	Mild Steel	Grade A of IS 2062
1	1	Base Plate	Fig. 8.1.3A	Mild Steel	Grade A of IS 2062

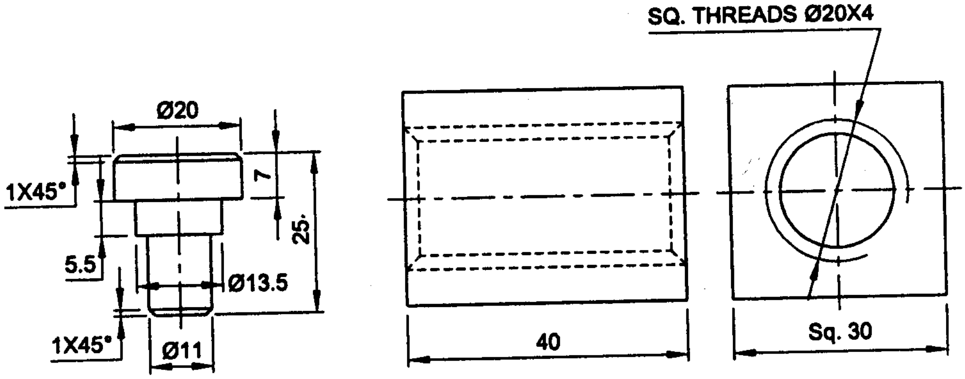
8.1.2F Rod Vice Base Assembly

All dimensions in millimetres.

FIG. 8.1.2 ROD VICE PARTS (*Concluded*)



8.1.3A Base Plate

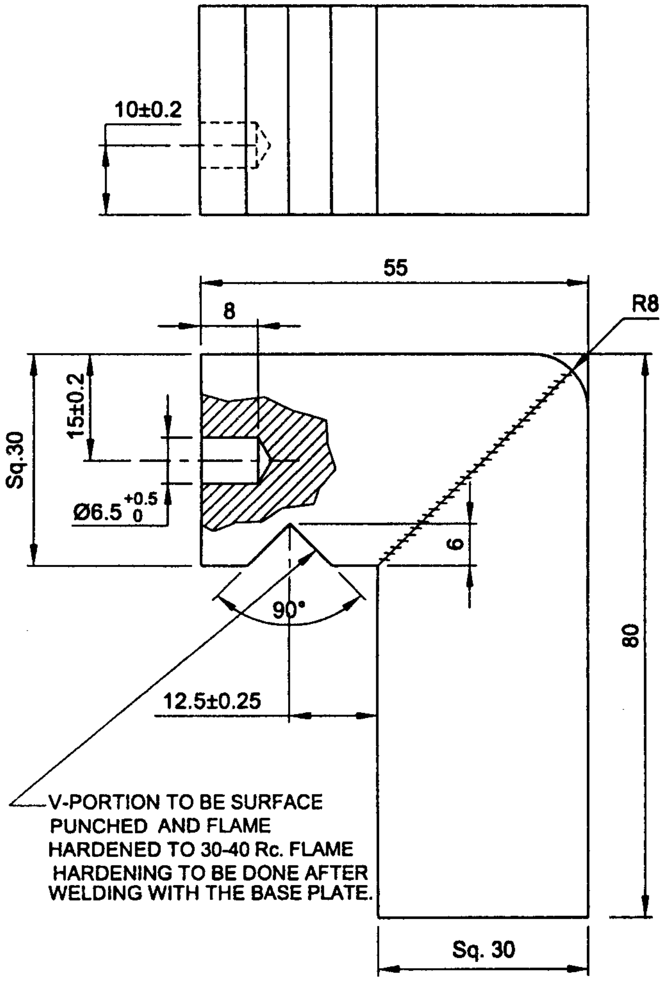


8.1.3B Base Plate Lug

8.1.3C Fixed Nut

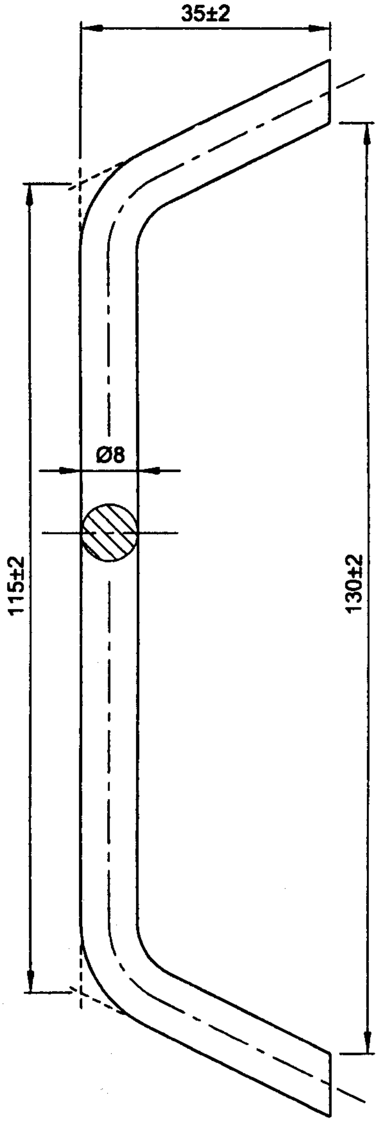
All dimensions in millimetres.

FIG. 8.1.3 ROD VICE BASE ASSEMBLY PARTS (*Continued*)

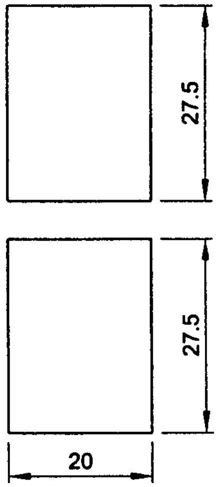


V-PORTION TO BE SURFACE PUNCHED AND FLAME HARDENED TO 30-40 Rc. FLAME HARDENING TO BE DONE AFTER WELDING WITH THE BASE PLATE.

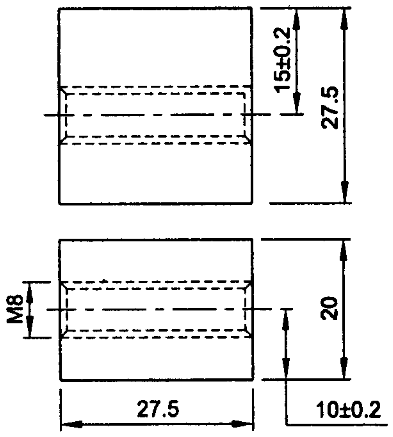
8.1.3D Supporting Block



8.1.03E Carrying Handle



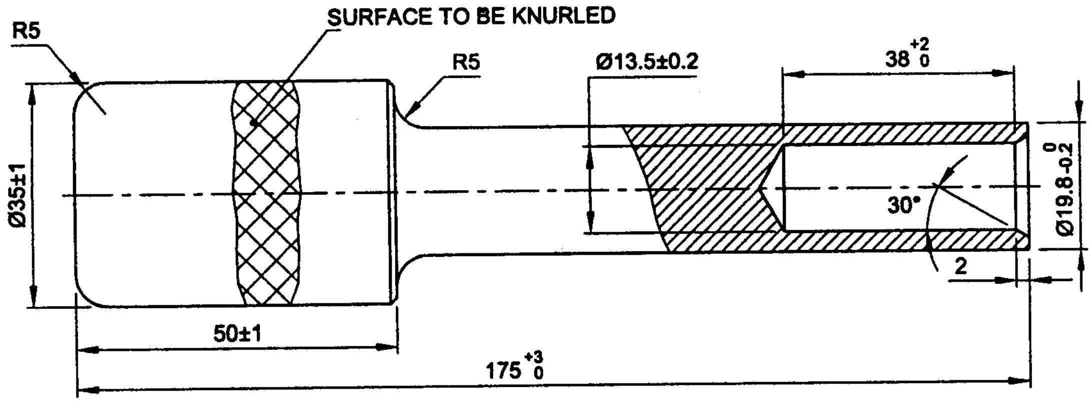
8.1.3F Fixed Block



8.1.3G Locking Block

All dimensions in millimetres.

FIG. 8.1.3 ROD VICE BASE ASSEMBLY PARTS (*Concluded*)

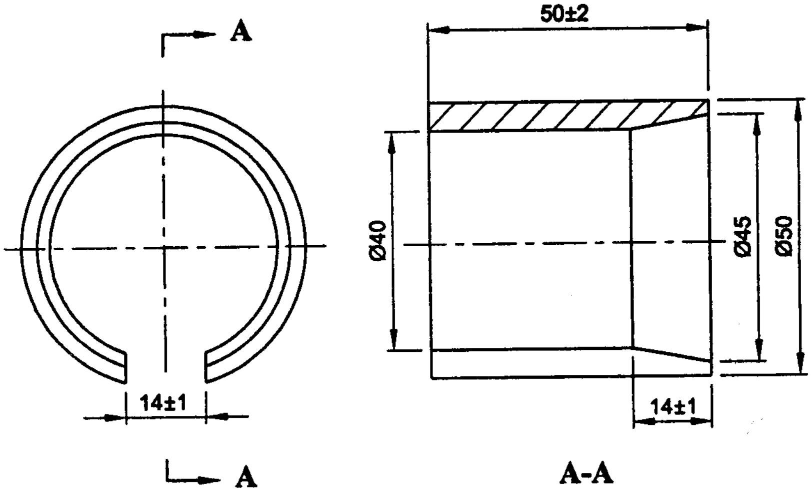


Part No.	No. Off	Description	Material	
1	1	Axle Punch	Mild Steel	Grade A of IS 2062

Carburized and hardened to 30-40 HRC.

All dimensions in millimetres.

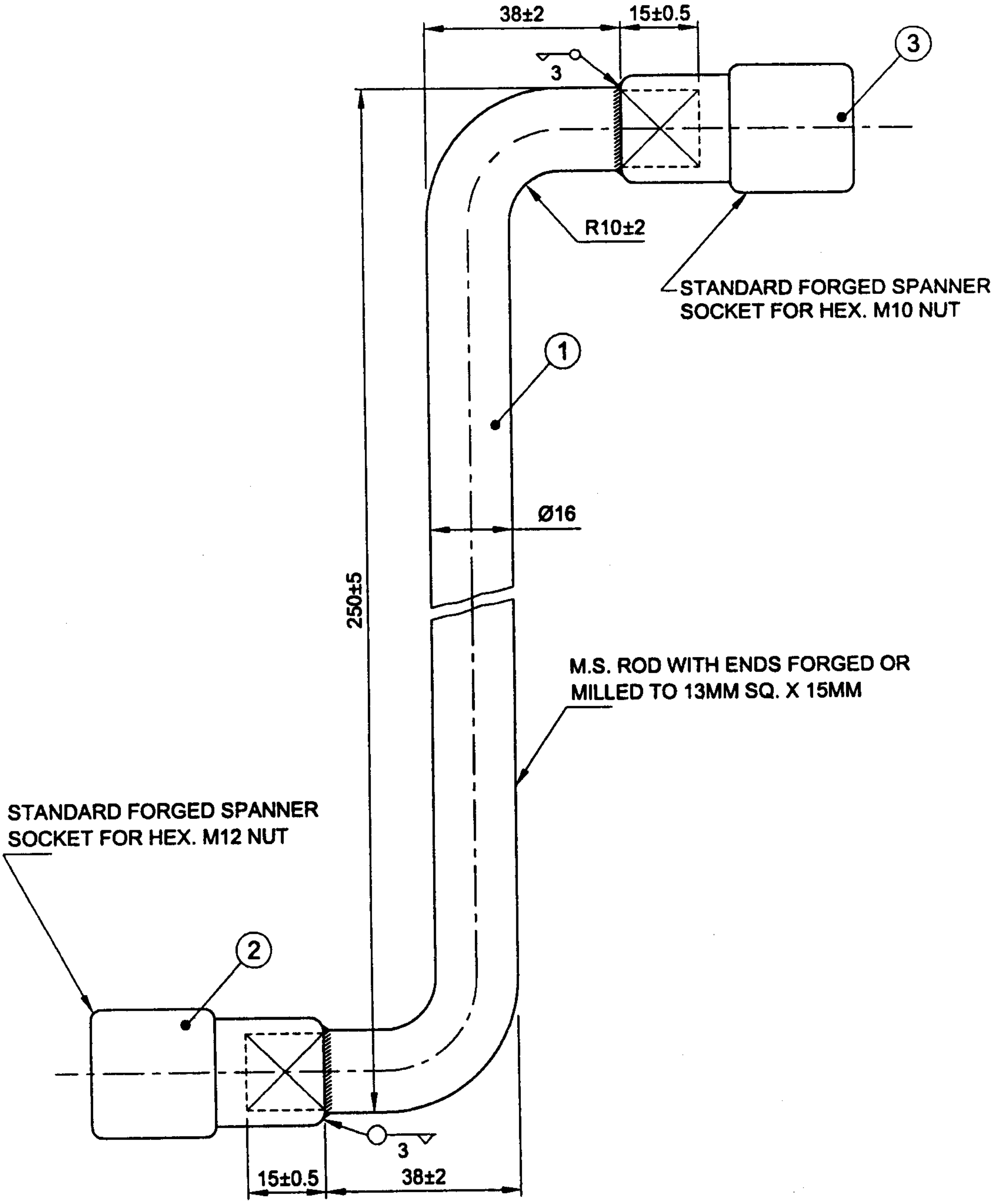
Fig. 8.1.4 Axle Punch



Part No.	No. Off	Description	Material	
1	1	Chain Coupler Supporting Tool	Mild Steel	Grade A of IS 2062

All dimensions in millimetres.

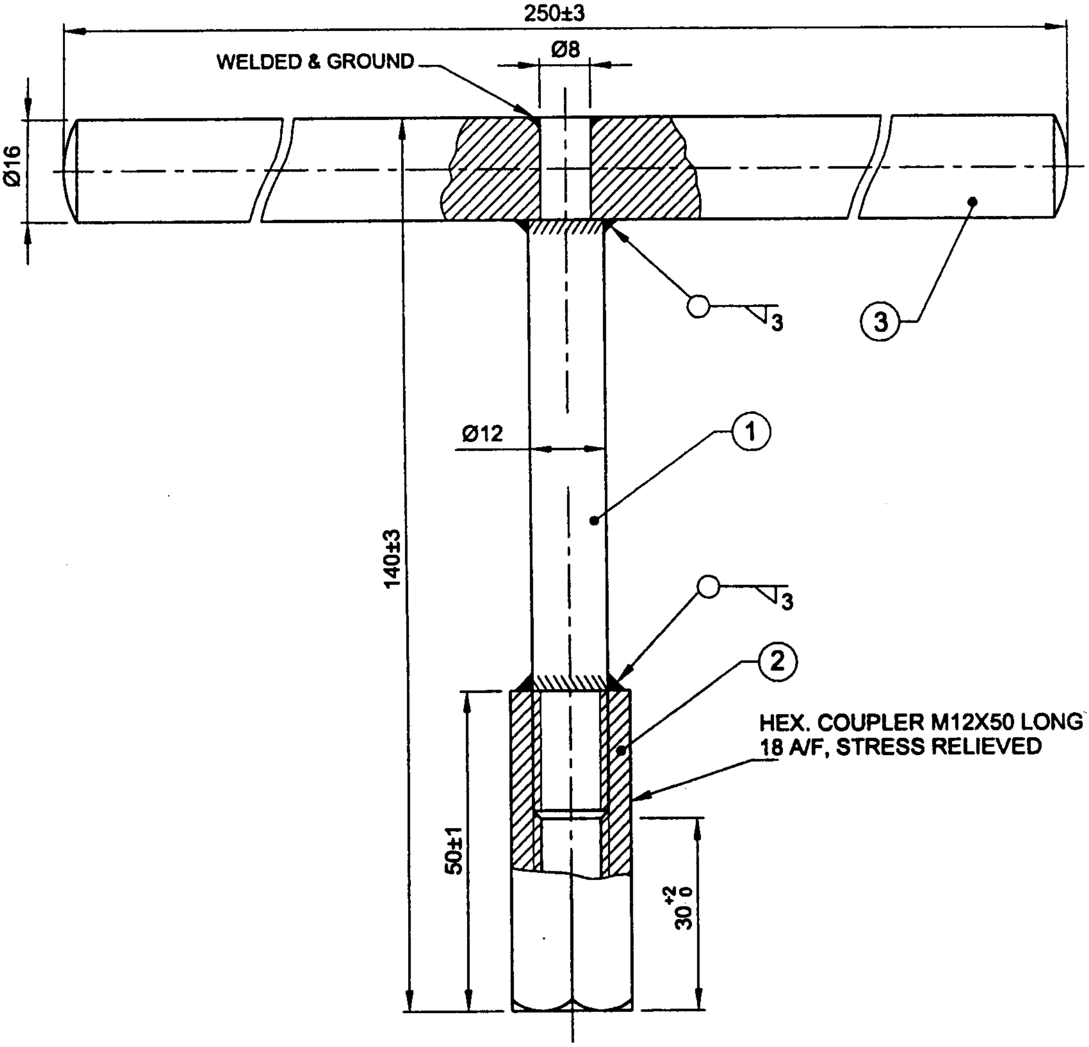
Fig. 8.1.5 Chain Coupler Supporting Tool


38±2
15±0.5
3
③
R10±2
STANDARD FORGED SPANNER SOCKET FOR HEX. M10 NUT
①
Ø16
250±5
M.S. ROD WITH ENDS FORGED OR MILLED TO 13MM SQ. X 15MM
STANDARD FORGED SPANNER SOCKET FOR HEX. M12 NUT
②
3
15±0.5
38±2

3	1	Socket Spanner (M10)	Steel	IS 2030
2	1	Socket Spanner (M12)	Steel	IS 2030
1	1	Rod	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

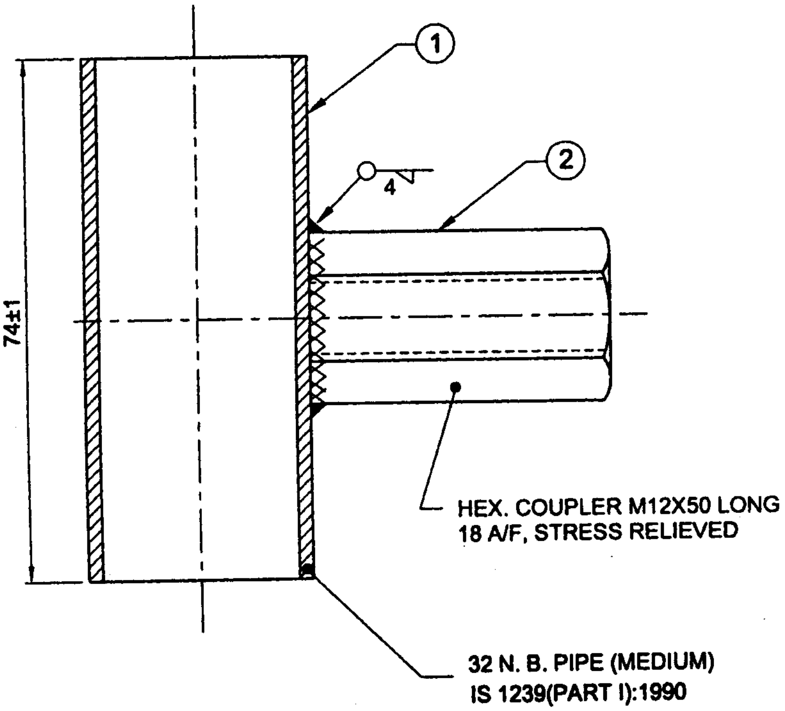
FIG. 8.1.6 CRANK SPANNER



Part No.	No. Off	Description	Material	
3	1	T-Rod	Mild Steel	Grade A of IS 2062
2	1	Hexagonal Coupler	Mild Steel	Grade A of IS 2062
1	1	Rod	Mild Steel	Grade A of IS 2062

All dimensions in millimetres.

FIG. 8.1.7 CONNECTING ROD LIFTER

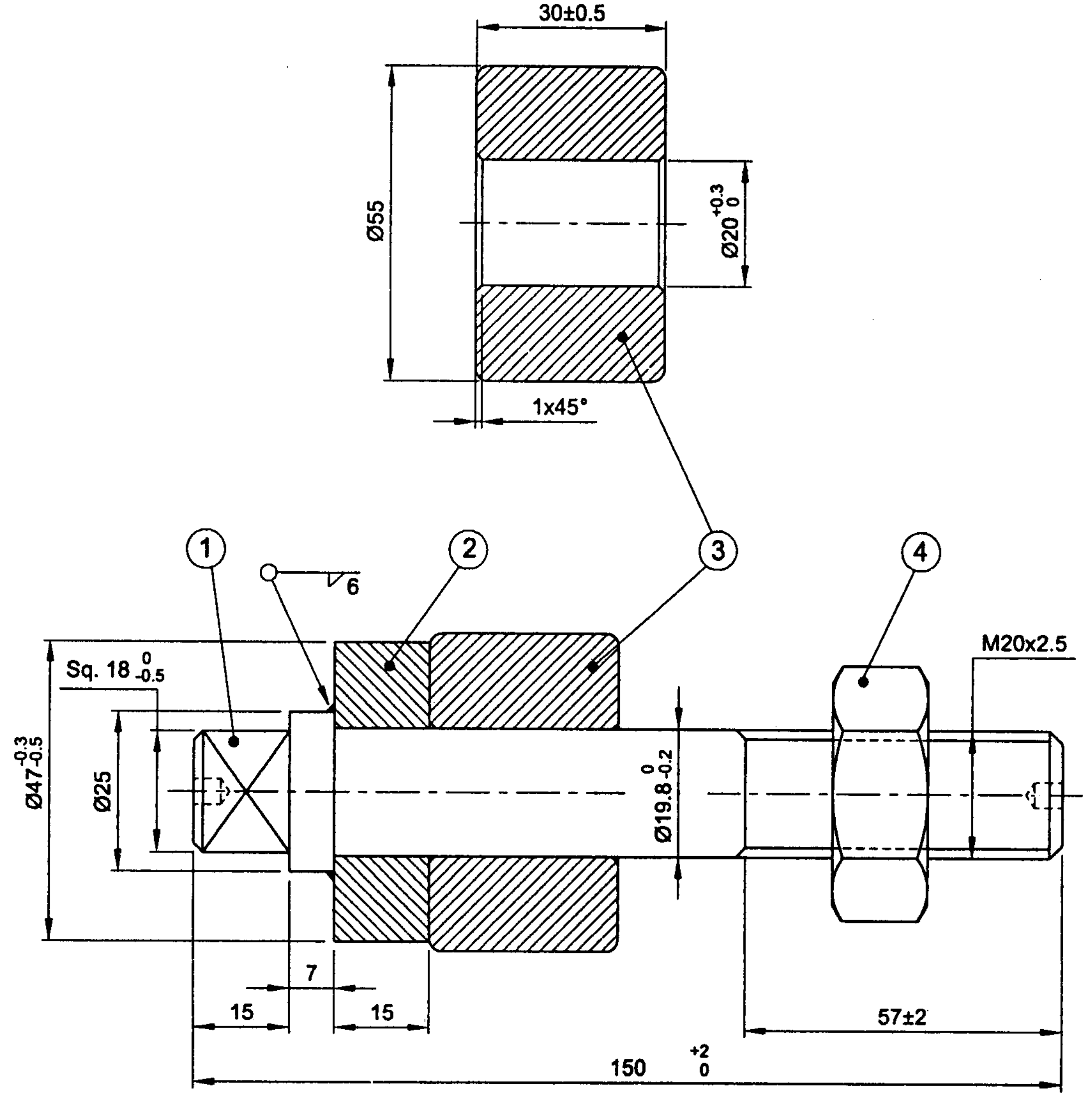


Part No.	No. Off	Description	Material	
2	1	Hexagonal Coupler	Mild Steel	Grade A of IS 2062
1	1	Pipe	Mild Steel	IS 1239 (Part 1)

NOTE — Inside surface of pipe shall be protected with Red Oxide Primer.

All dimensions in millimetres.

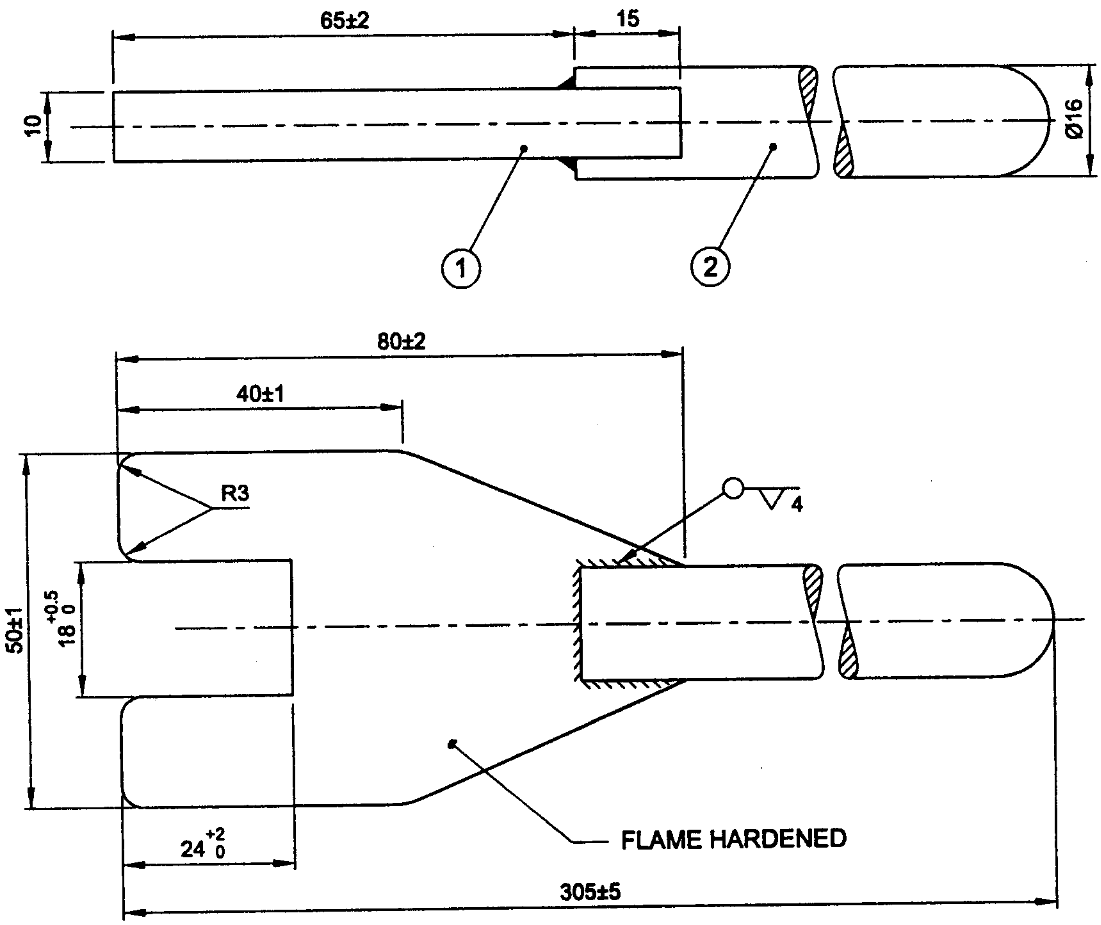
FIG. 8.1.8 CONNECTING ROD LIFTER (ALTERNATE DESIGN)



4	1	Hex. Nut, M20 × 2.5	Steel	IS 1363 (Part 3)
3	1	Spacer	Mild Steel	Grade A of IS 2062
2	1	Fixed Coupler	Mild Steel	Grade A of IS 2062
1	1	Shaft	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

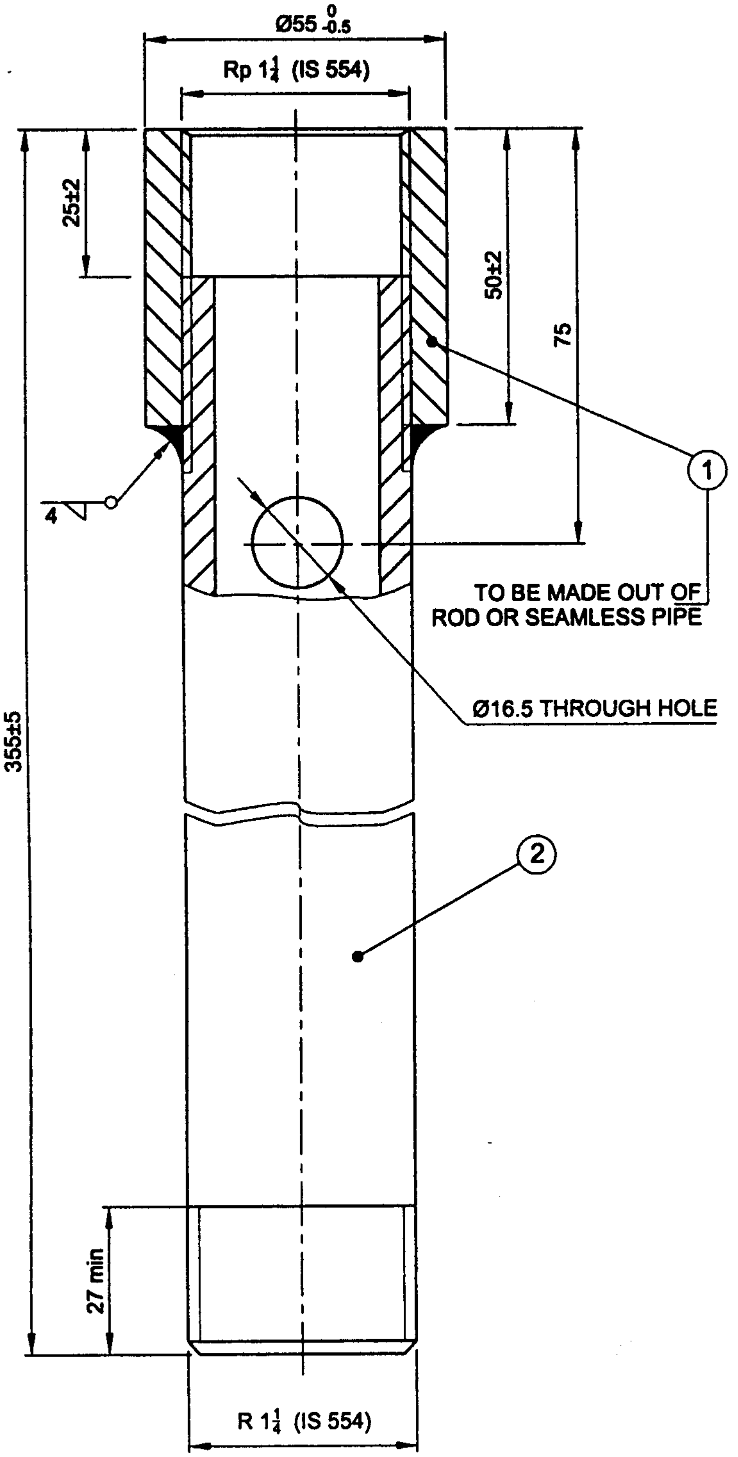
FIG. 8.1.9 BEARING PRESSING TOOL



2 1	1 1	Rod Plate	Mild Steel Mild Steel	Grade A of IS 2062 Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

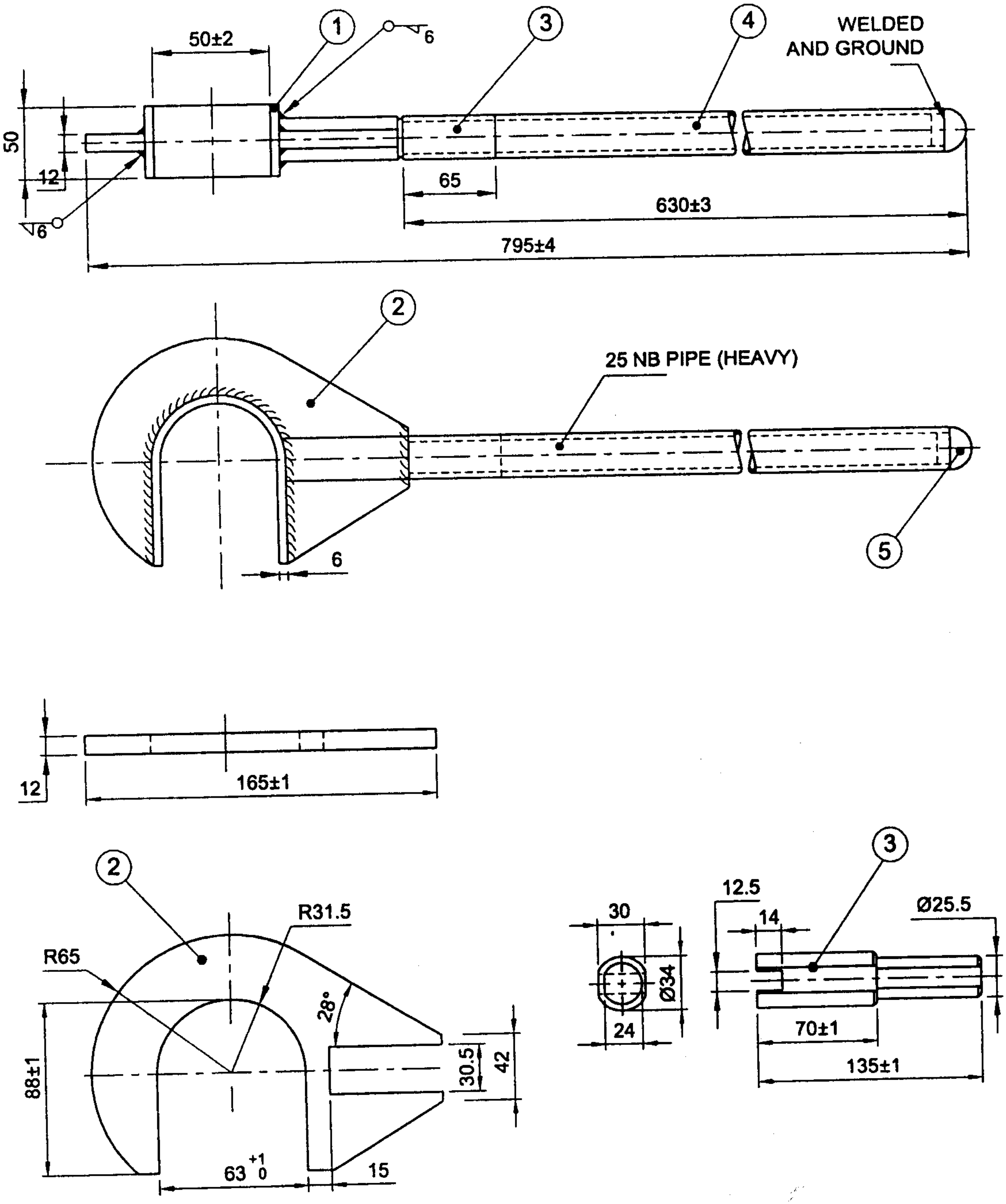
FIG. 8.1.10 ROD COUPLER SPANNER



2 1	1 1	Pipe, 32 NB Pipe Coupler	Steel Mild Steel	IS 1239 (Part 1) — Medium Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

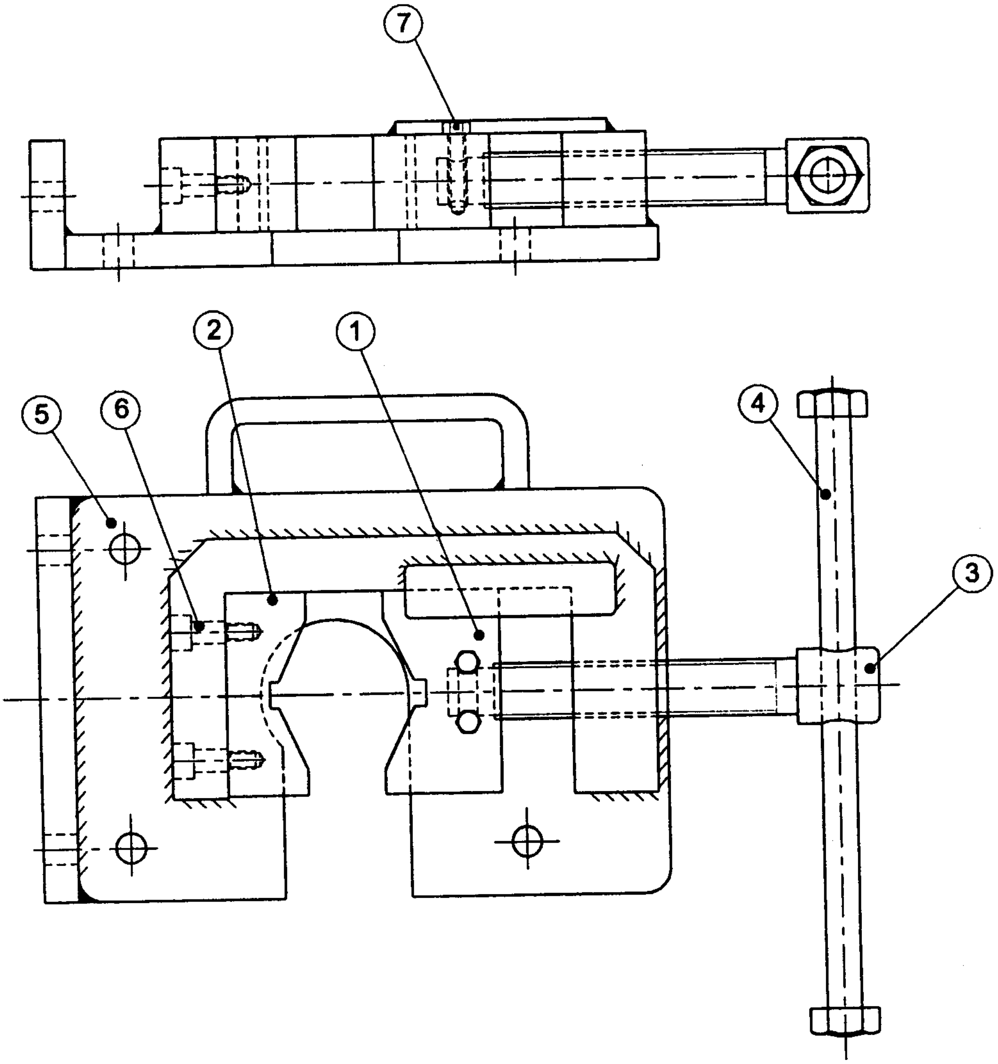
FIG. 8.2.1 WATER TANK LIFTER



Part No.	No. Off	Description	Material	
5	1	End Plug	Mild Steel	Grade A of IS 2062
4	1	Pipe, 25 NB	Mild Steel	IS 1239 (Part 1) — Heavy
3	1	Split Road	Mild Steel	Grade A of IS 2062
2	1	Hook Plate	Mild Steel	Grade A of IS 2062
1	1	'U' Plate	Mild Steel	Grade A of IS 2062

All dimensions in millimetres.

FIG. 8.2.2 PIPE LIFTING SPANNER

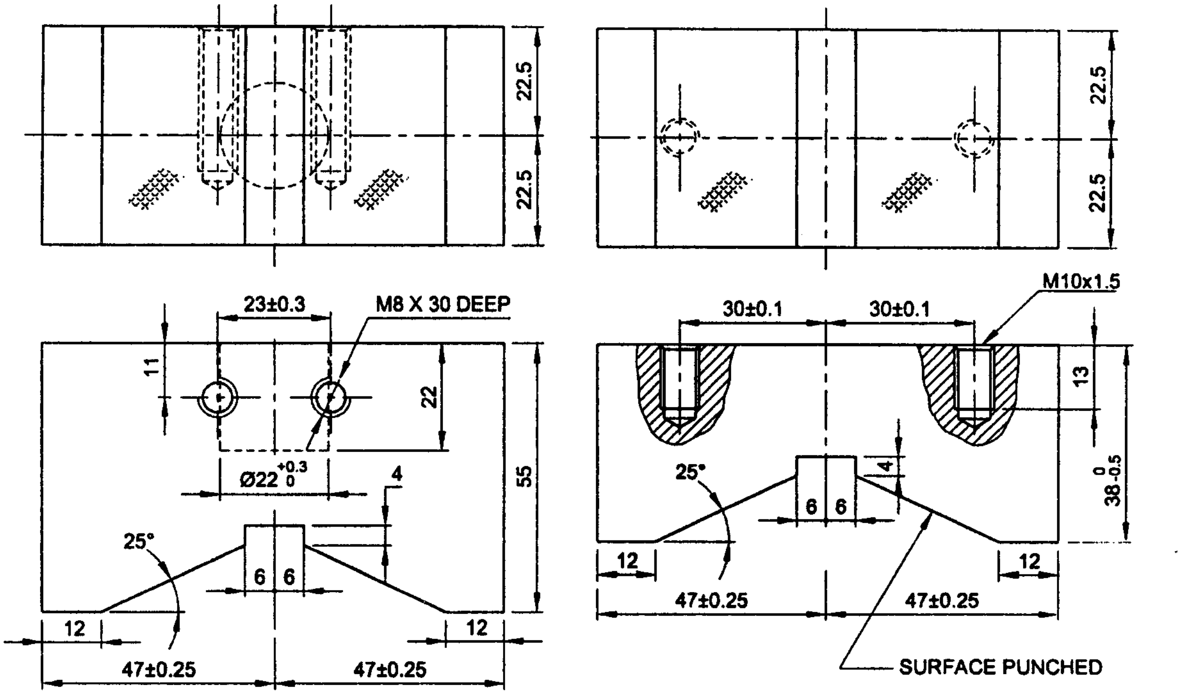


Part No.	No. Off	Description	Reference	Material	
7	2	Hex. Bolt M8 × 30	Std 07	Steel	IS 1363 (Part 1)
6	2	Hexagon Socket Head Cap Screw M10 × 25	Std 08	Steel	IS 2269
5	1	Clamp Base Assembly	Fig. 8.2.4E	Mild Steel	Grade A of IS 2062
4	1	Handle	Fig. 8.2.4D	Mild Steel	Grade A of IS 2062
3	1	Threaded Shaft	Fig. 8.2.4C	Mild Steel	Grade A of IS 2062
2	1	Fixed Jaw	Fig. 8.2.4B	Mild Steel	Grade A of IS 2062
1	1	Movable Jaw	Fig. 8.2.4A	Mild Steel	Grade A of IS 2062

NOTE — This clamp is suited up to 45 m depth application. Alternative pipe clamp arrangements may be used for application beyond 45 m.

All dimensions in millimetres.

FIG. 8.2.3 HEAVY DUTY CLAMP

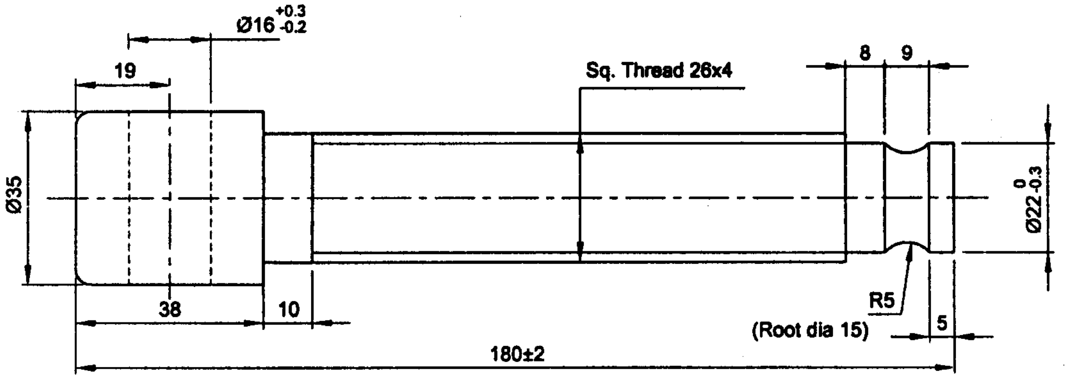


CARBURISED AND HARDENED TO 40-45 HRC

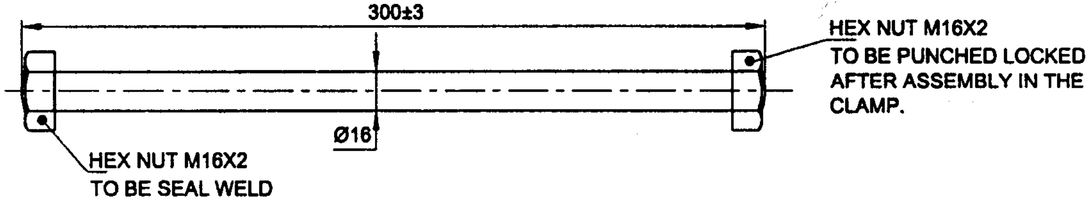
CARBURISED AND HARDENED TO 40-45 HRC

8.2.4A Movable Jaw

8.2.4B Fixed Jaw



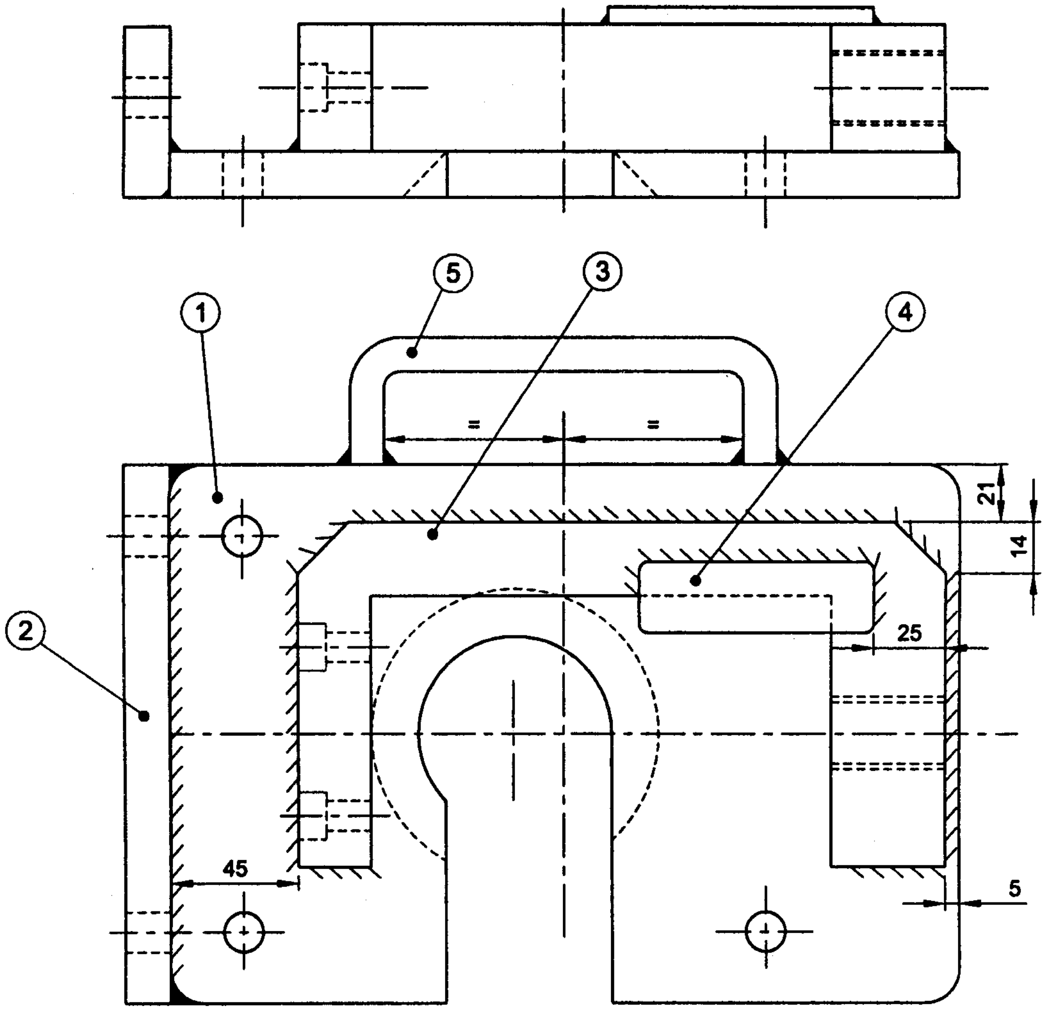
8.2.4C Threaded Shaft



8.2.4D Handle

All dimensions in millimetres.

FIG. 8.2.4 HEAVY DUTY CLAMP PARTS (*Continued*)

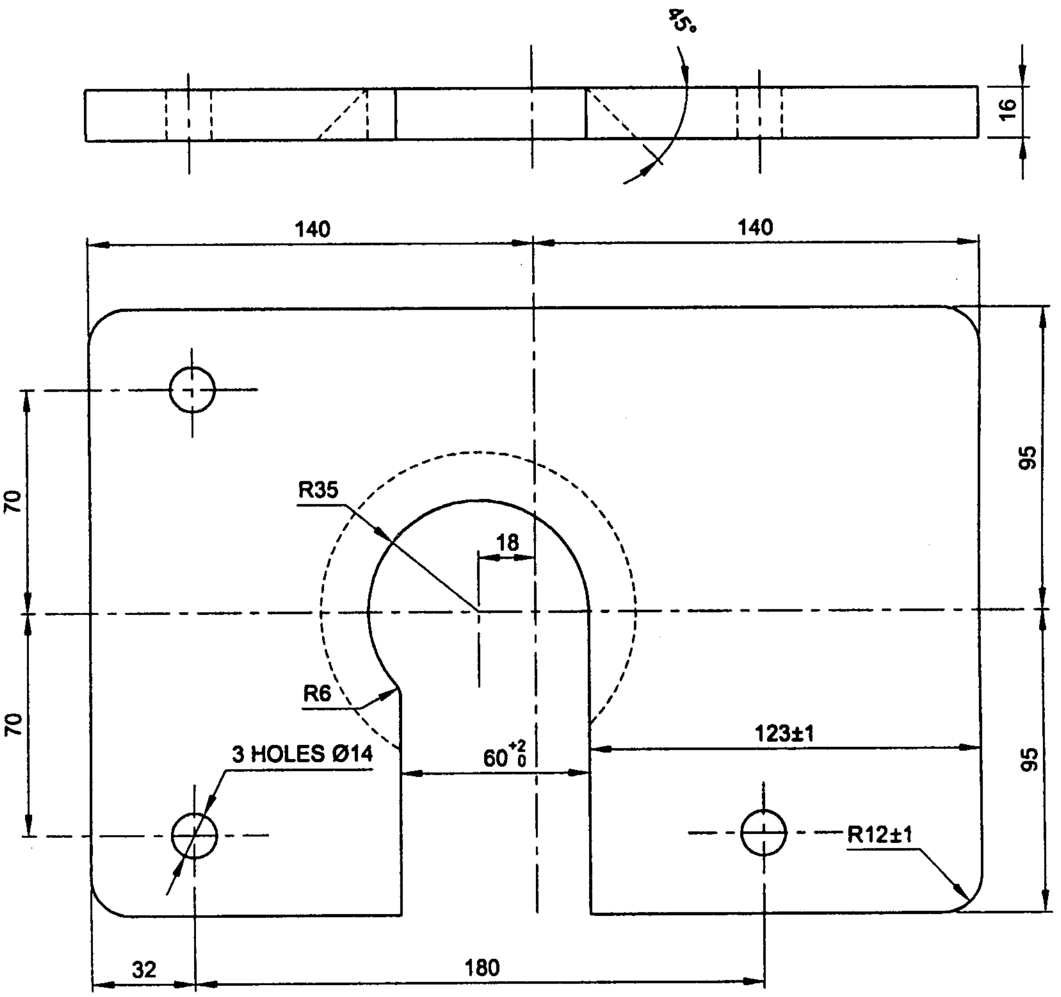


5	1	Carrying Handle	Fig. 8.2.5E	Mild Steel	Grade A of IS 2062
4	1	Guide Plate	Fig. 8.2.5D	Mild Steel	Grade A of IS 2062
3	1	Supporting Block	Fig. 8.2.5C	Mild Steel	Grade A of IS 2062
2	1	Side Plate	Fig. 8.2.5B	Mild Steel	Grade A of IS 2062
1	1	Base Plate	Fig. 8.2.5A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

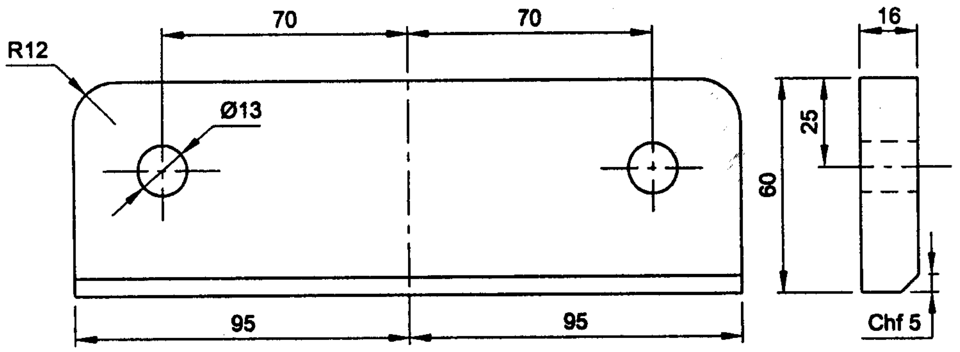
8.2.4E Clamp Base Assembly

All dimensions in millimetres.

FIG. 8.2.4 HEAVY DUTY CLAMP PARTS (*Concluded*)



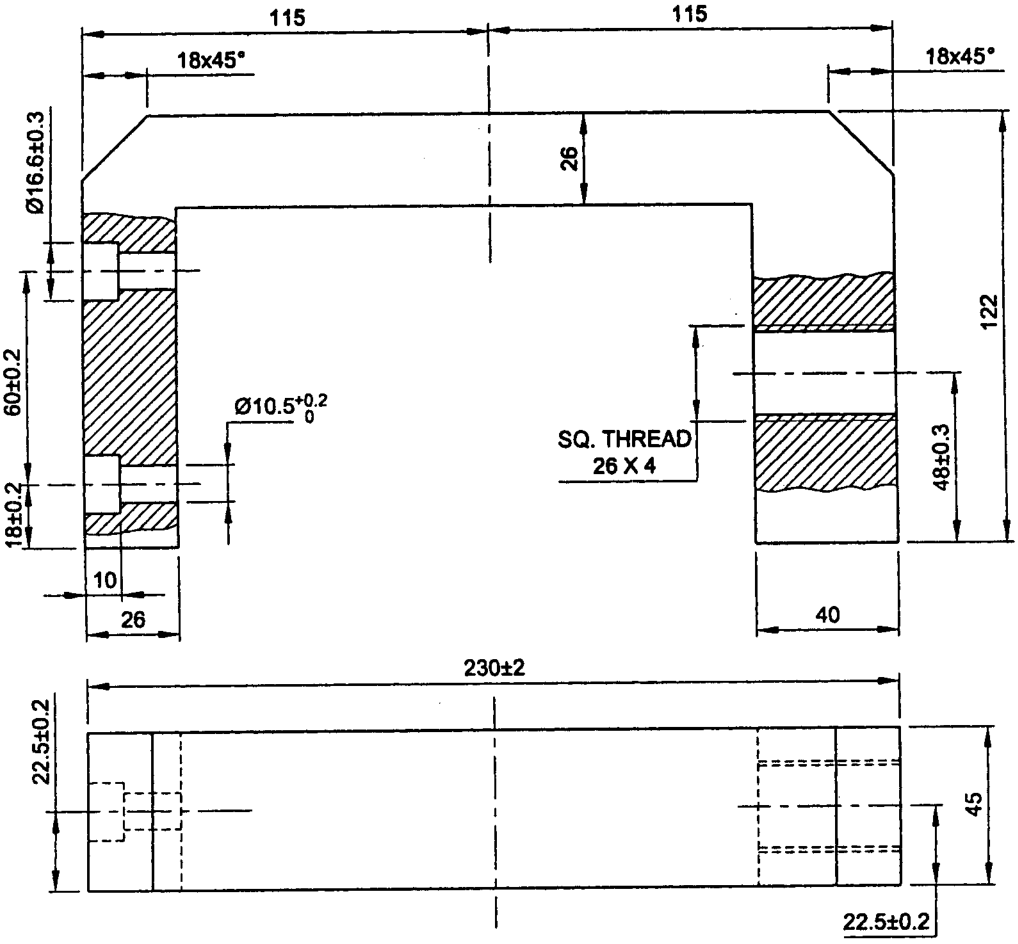
8.2.5A Base Plate



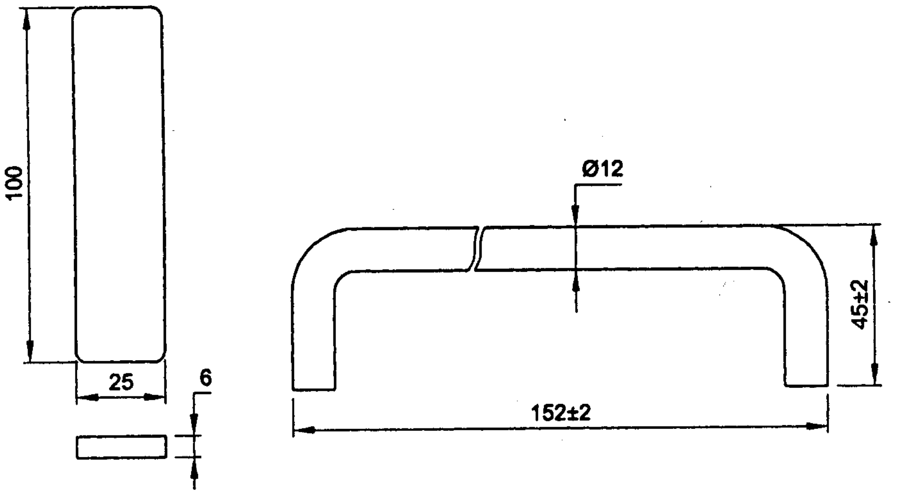
8.2.5B Side Plate

All dimensions in millimetres.

FIG. 8.2.5 CLAMP BASE ASSEMBLY PARTS (*Continued*)



8.2.5C Supporting Block

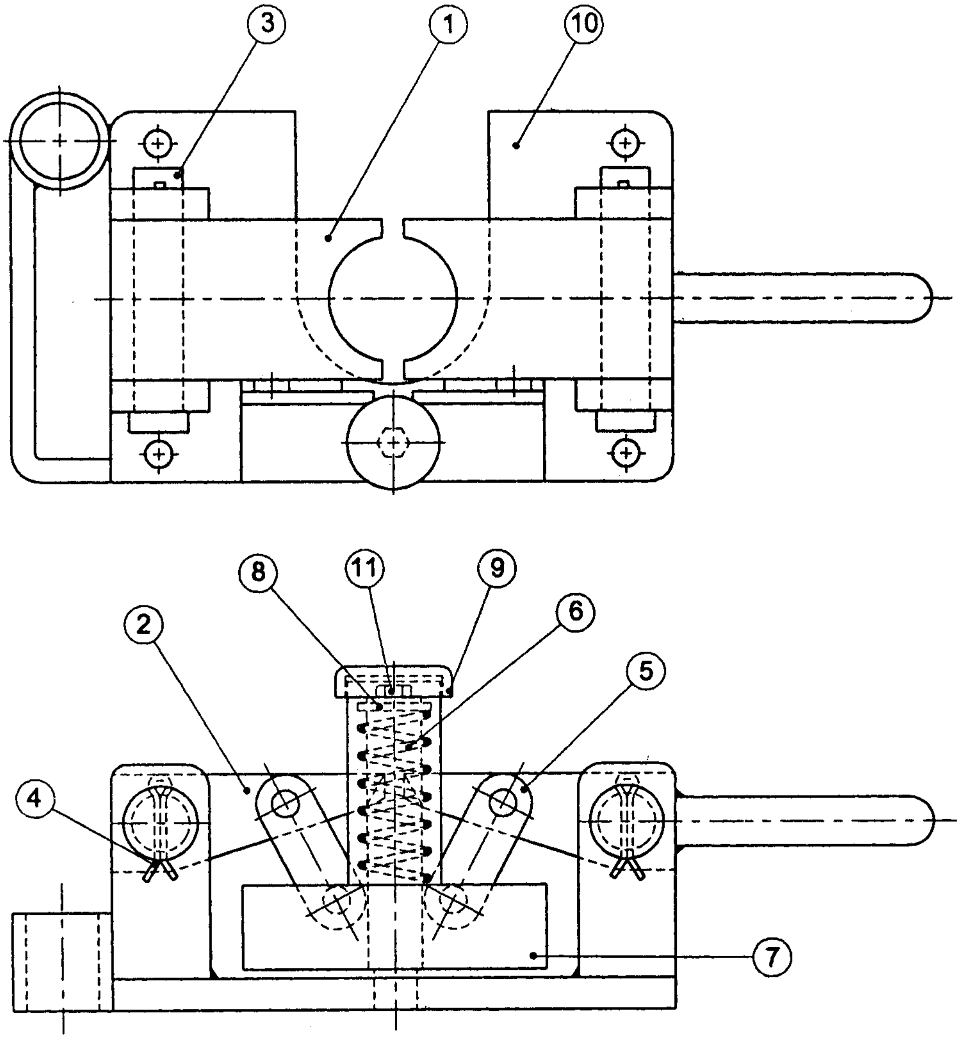


8.2.5D Guide Plate

8.2.5E Carrying Handle

All dimensions in millimetres.

FIG. 8.2.5 CLAMP BASE ASSEMBLY PARTS (*Concluded*)

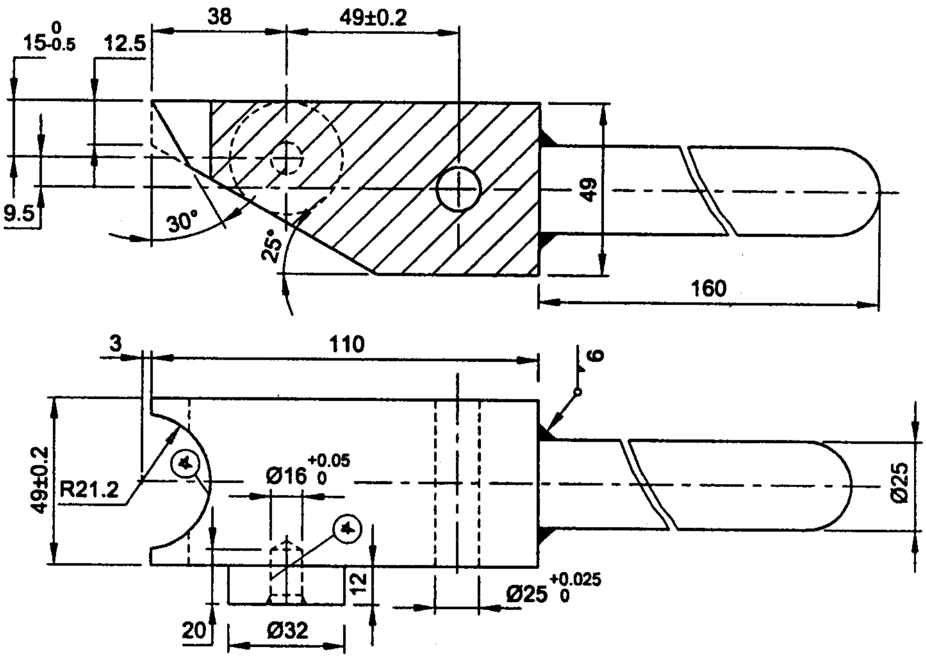


11	1	Bolt M12 × 30 long	Std 11	Steel	IS 1364 (Part 1) — Gr 10.9
10	1	Base Assembly	Fig. 8.2.7J	Mild Steel	Grade A of IS 2062
9	1	Protection Cover	Fig. 8.2.7I	Mild Steel	Grade A of IS 2062
8	1	Spring Retainer	Fig. 8.2.7H	Mild Steel	Grade A of IS 2062
7	2	Lifting Block	Fig. 8.2.7G	Mild Steel	Grade A of IS 2062
6	1	Spring	Fig. 8.2.7F	Spring Steel	IS 4454 (Part 1)
5	2	Link Plate	Fig. 8.2.7E	Mild Steel	Grade A of IS 2062
4	2	Split Pin	Fig. 8.2.7D	Steel	IS 549
3	1	Axle Pin	Fig. 8.2.7C	Carbon Steel	40 C8 of IS 5517
2	1	Left Hand Jaw	Fig. 8.2.7B	Mild Steel	Grade A of IS 2062
1	1	Right Hand Jaw	Fig. 8.2.7A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

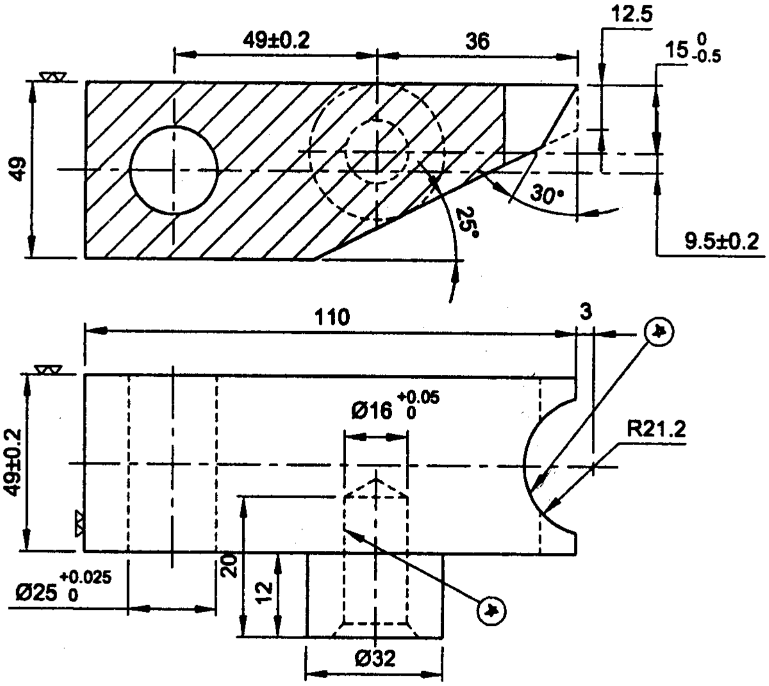
NOTE — This clamp is suited up to 45 m depth application. Alternative pipe clamp arrangements may be used for application beyond 45 m.

All dimensions in millimetres.

FIG. 8.2.6 SELF-LOCKING CLAMP



8.2.7A Right Hand Jaw

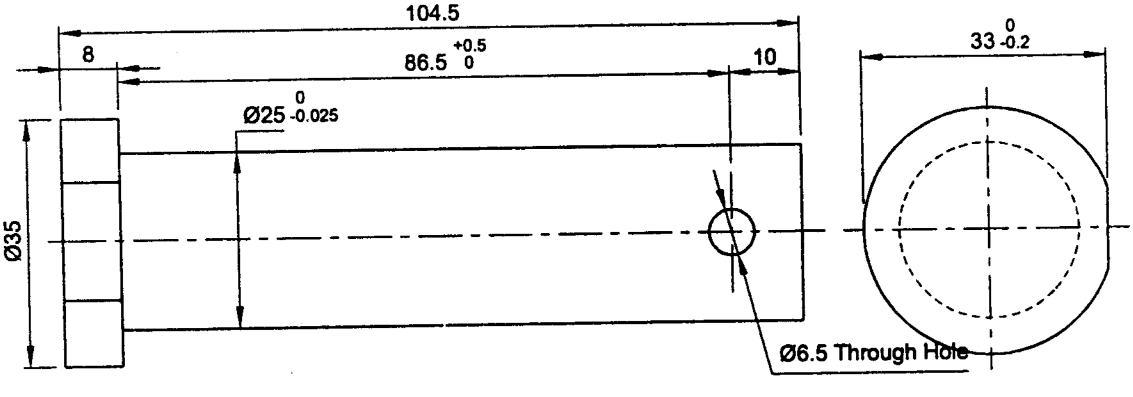


8.2.7B Left Hand Jaw

Surface hardened to 30-50 HRC.

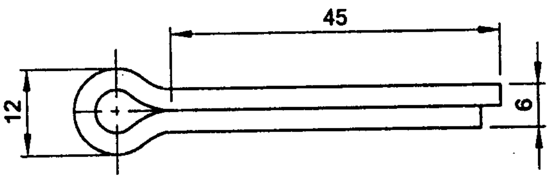
All dimensions in millimetres.

FIG. 8.2.7 SELF-LOCKING CLAMP PARTS (*Continued*)

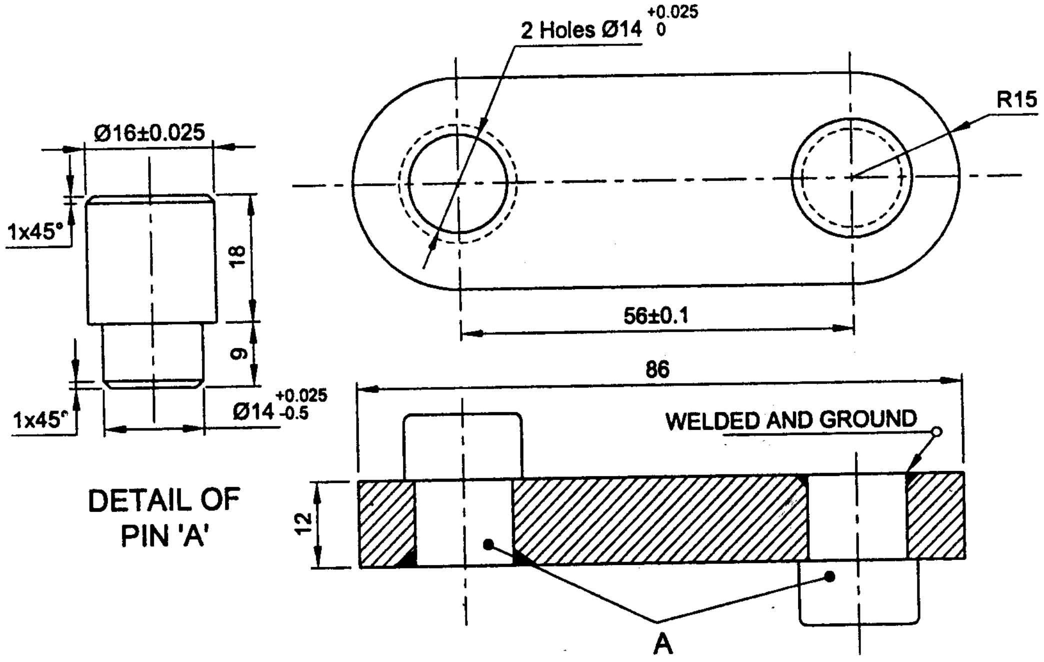


Surface Hardened to 30-50 HRC

8.2.7C Axle Pin



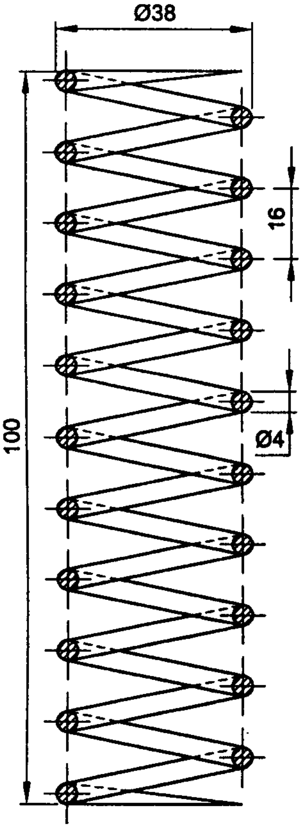
8.2.7D Split Pin



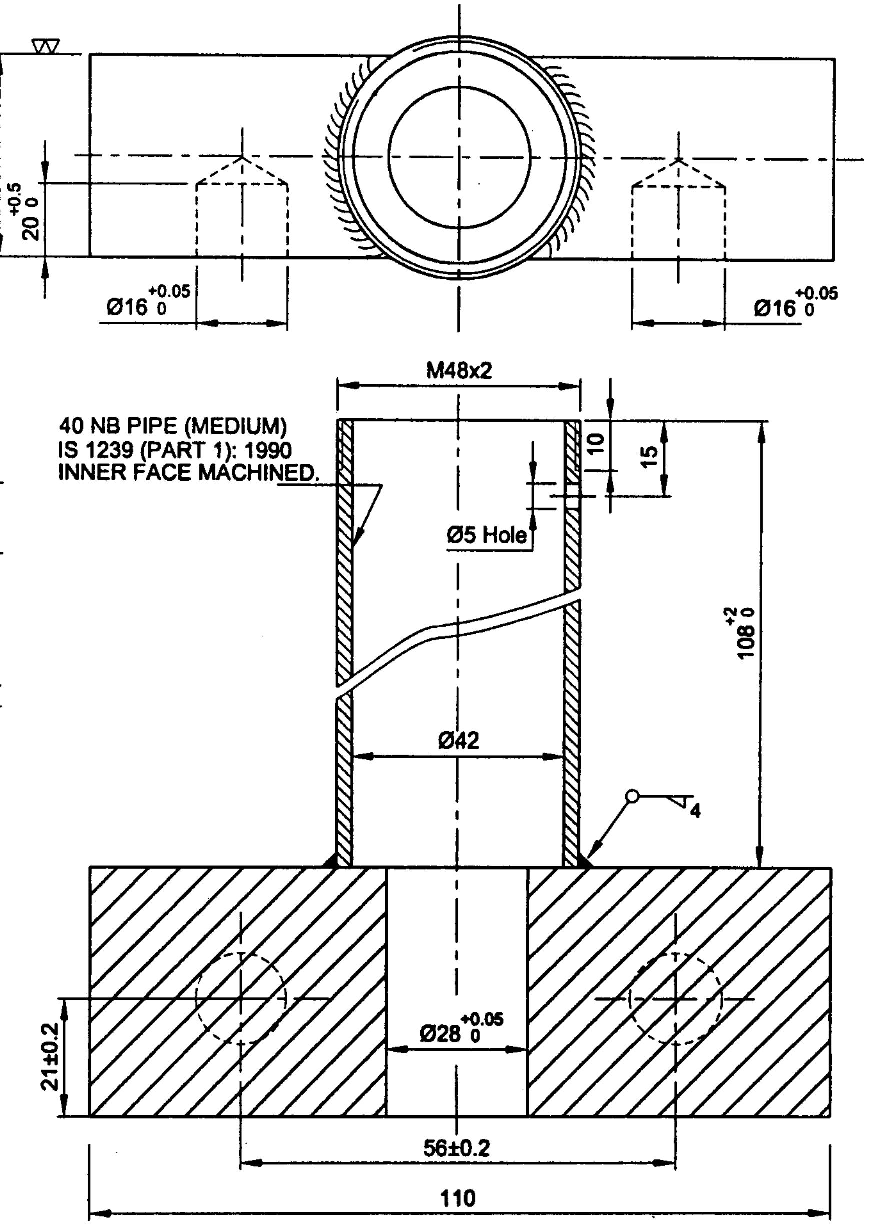
8.2.7E Link Plate

All dimensions in millimetres.

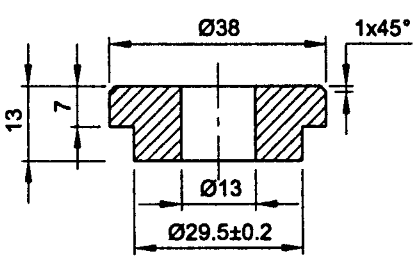
FIG. 8.2.7 SELF-LOCKING CLAMP PARTS (*Continued*)



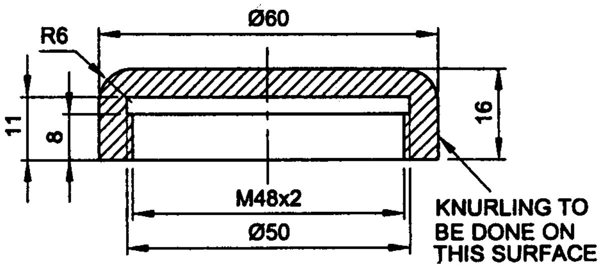
8.2.7F Spring



8.2.7G Lifter Block



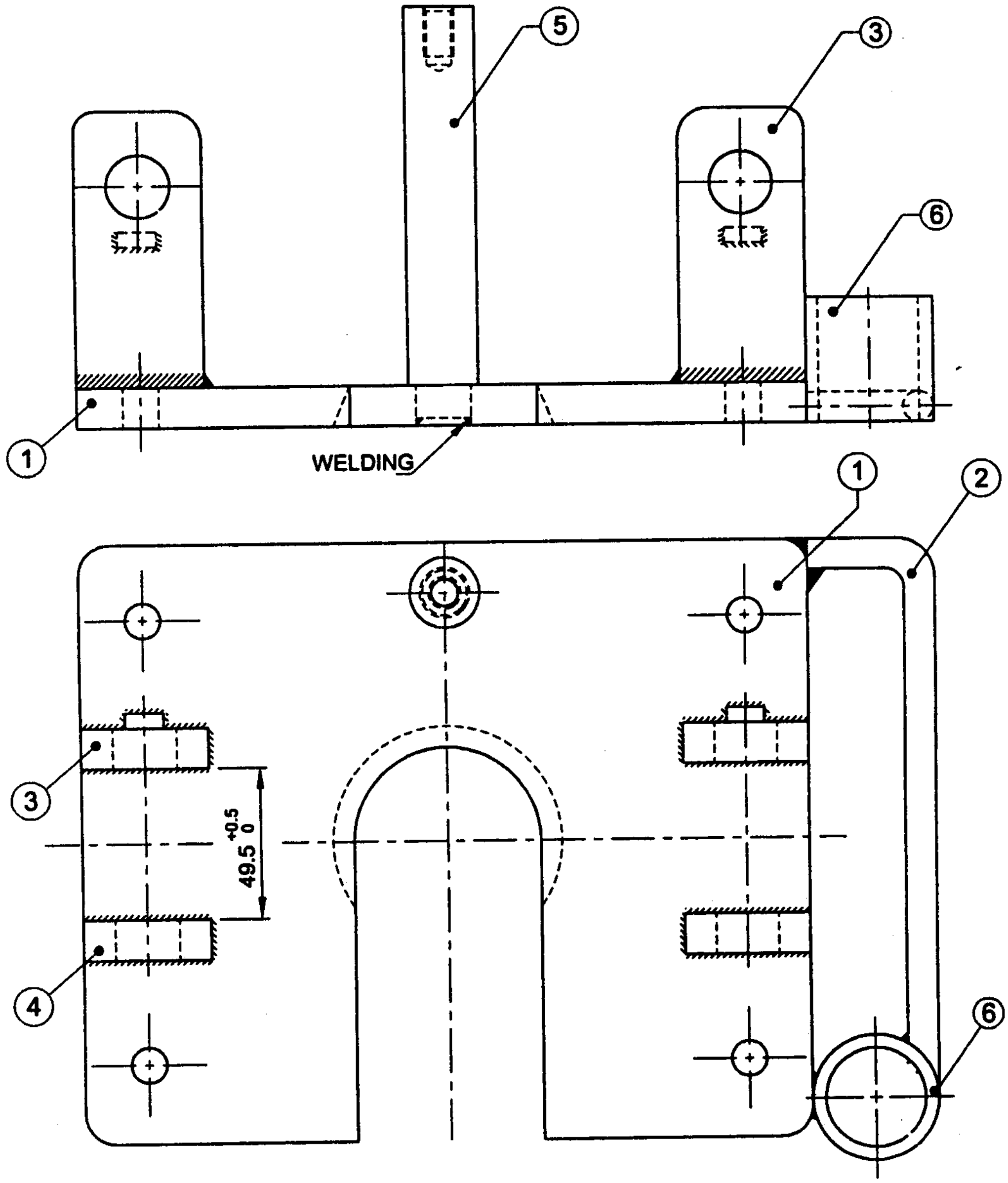
8.2.7H Spring Retainer



8.2.7 I Cover

All dimensions in millimetres.

FIG. 8.2.7 SELF-LOCKING CLAMP PARTS (*Continued*)

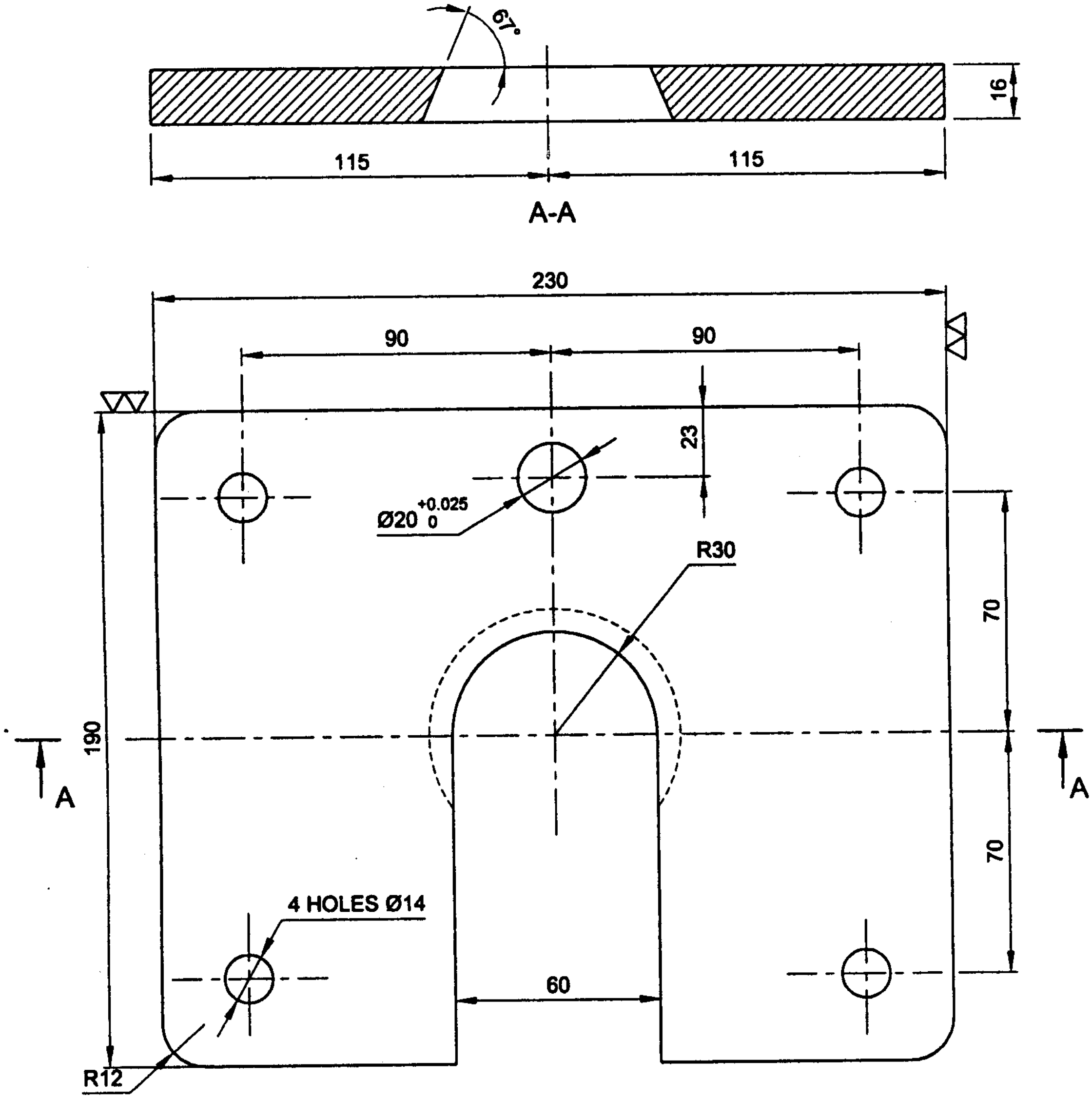


6	1	Pipe Lifter Holder	Fig. 8.2.8F	Mild Steel	Grade A of IS 2062
5	2	Guide Pillar	Fig. 8.2.8E	Carbon Steel	40 C8 of IS 5517
4	2	Supporting Pillar	Fig. 8.2.8D	Mild Steel	Grade A of IS 2062
3	2	Supporting Pillar with Stopper	Fig. 8.2.8C	Mild Steel	Grade A of IS 2062
2	1	Handle	Fig. 8.2.8B	Mild Steel	Grade A of IS 2062
1	1	Base Plate	Fig. 8.2.8A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

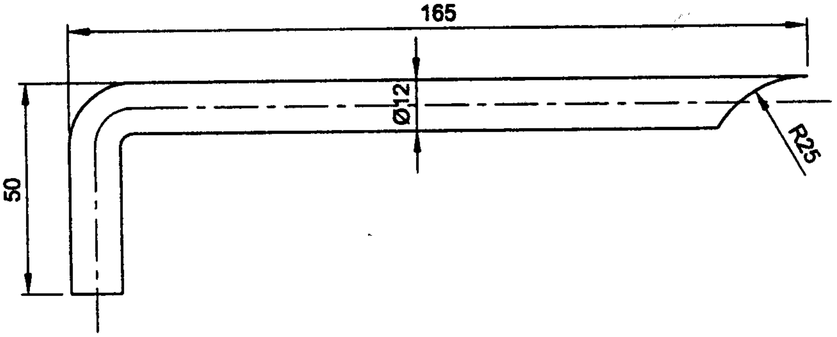
8.2.7J Base Assembly

All dimensions in millimetres.

FIG. 8.2.7 SELF-LOCKING CLAMP PARTS (*Concluded*)



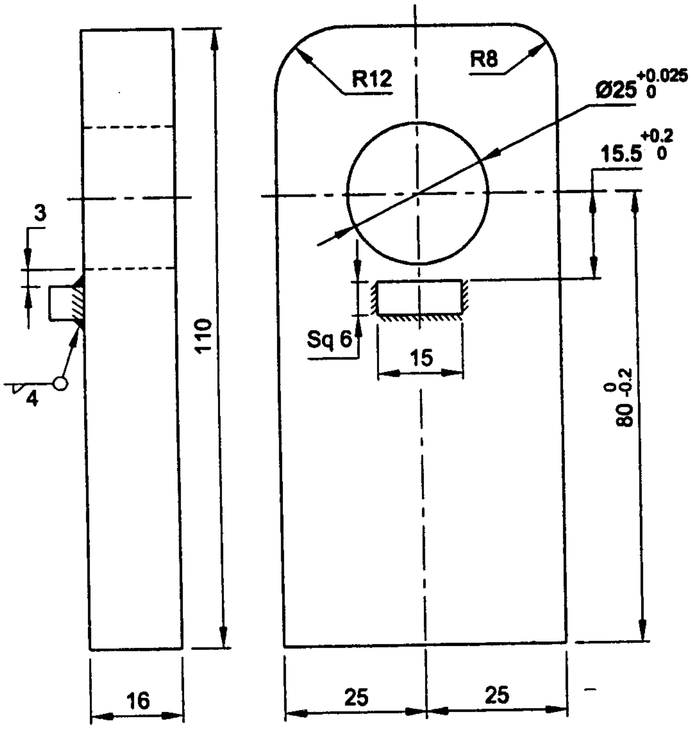
8.2.8A Base Plate



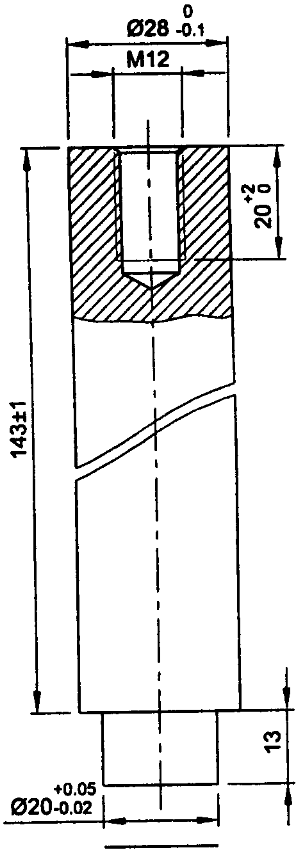
8.2.8B Handle

All dimensions in millimetres.

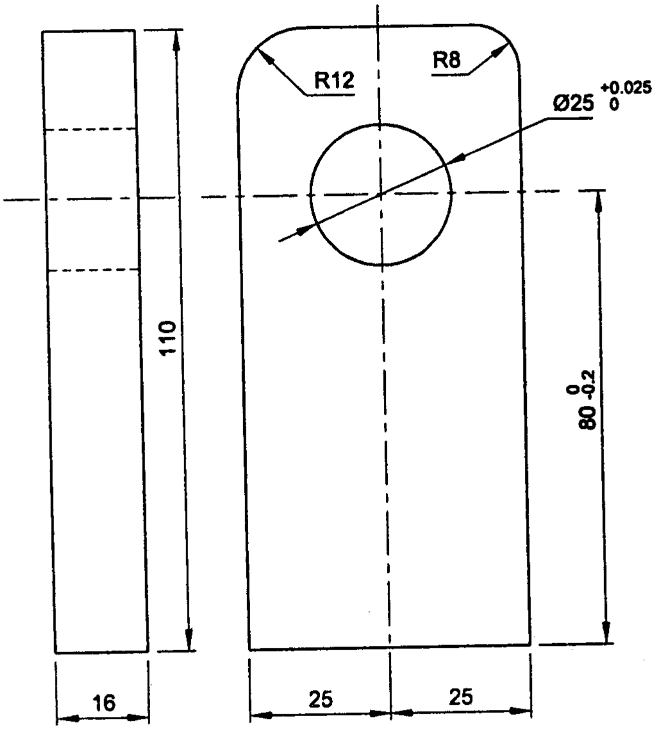
FIG. 8.2.8 BASE ASSEMBLY PARTS (*Continued*)



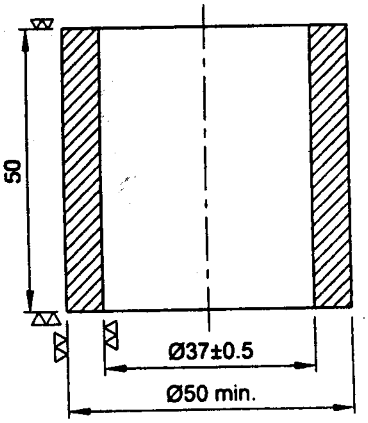
8.2.8C Supporting Pillar with Stopper



8.2.8E Guide Pillar



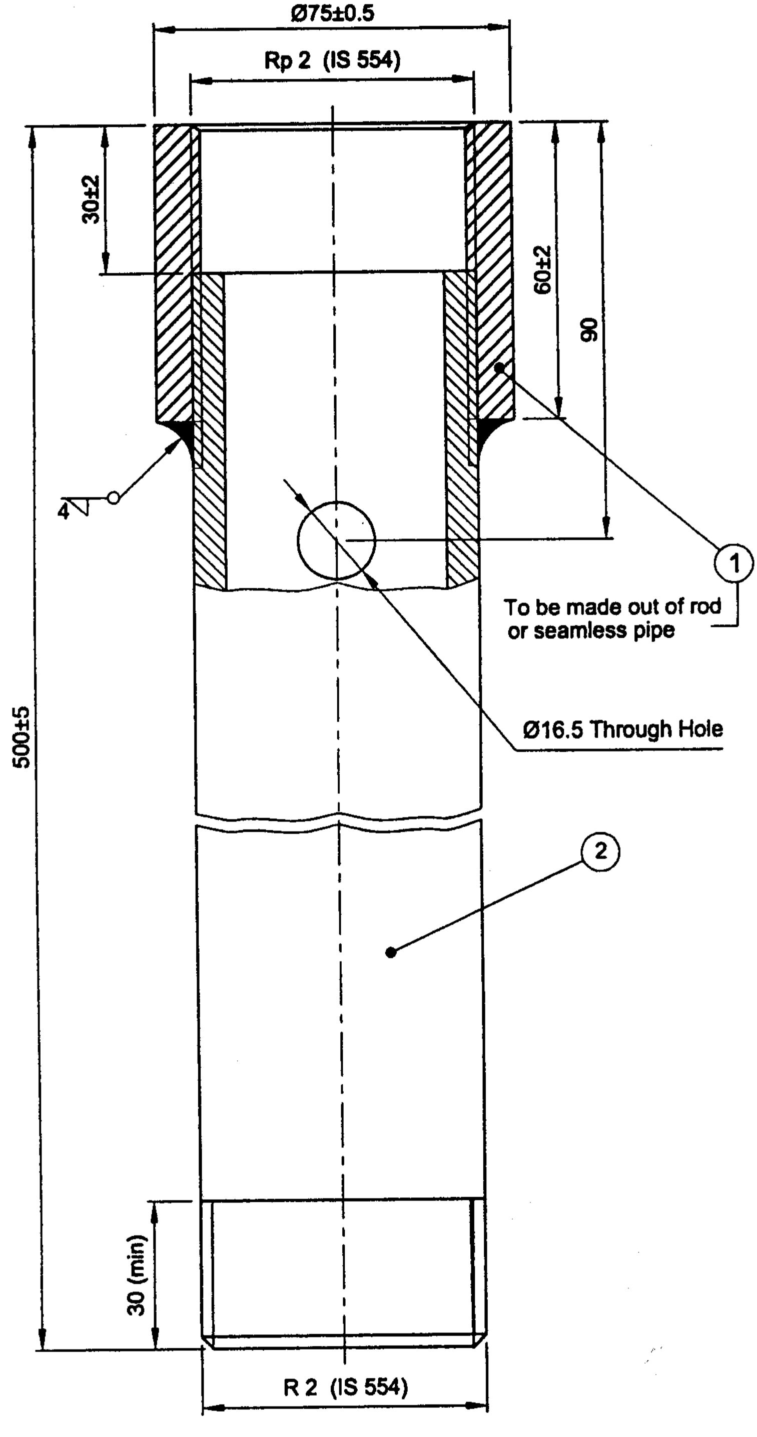
8.2.8D Supporting Pillar



8.2.8F Pipe-Lifter Holder

All dimensions in millimetres.

Fig. 8.2.8 Base Assembly Parts (*Concluded*)

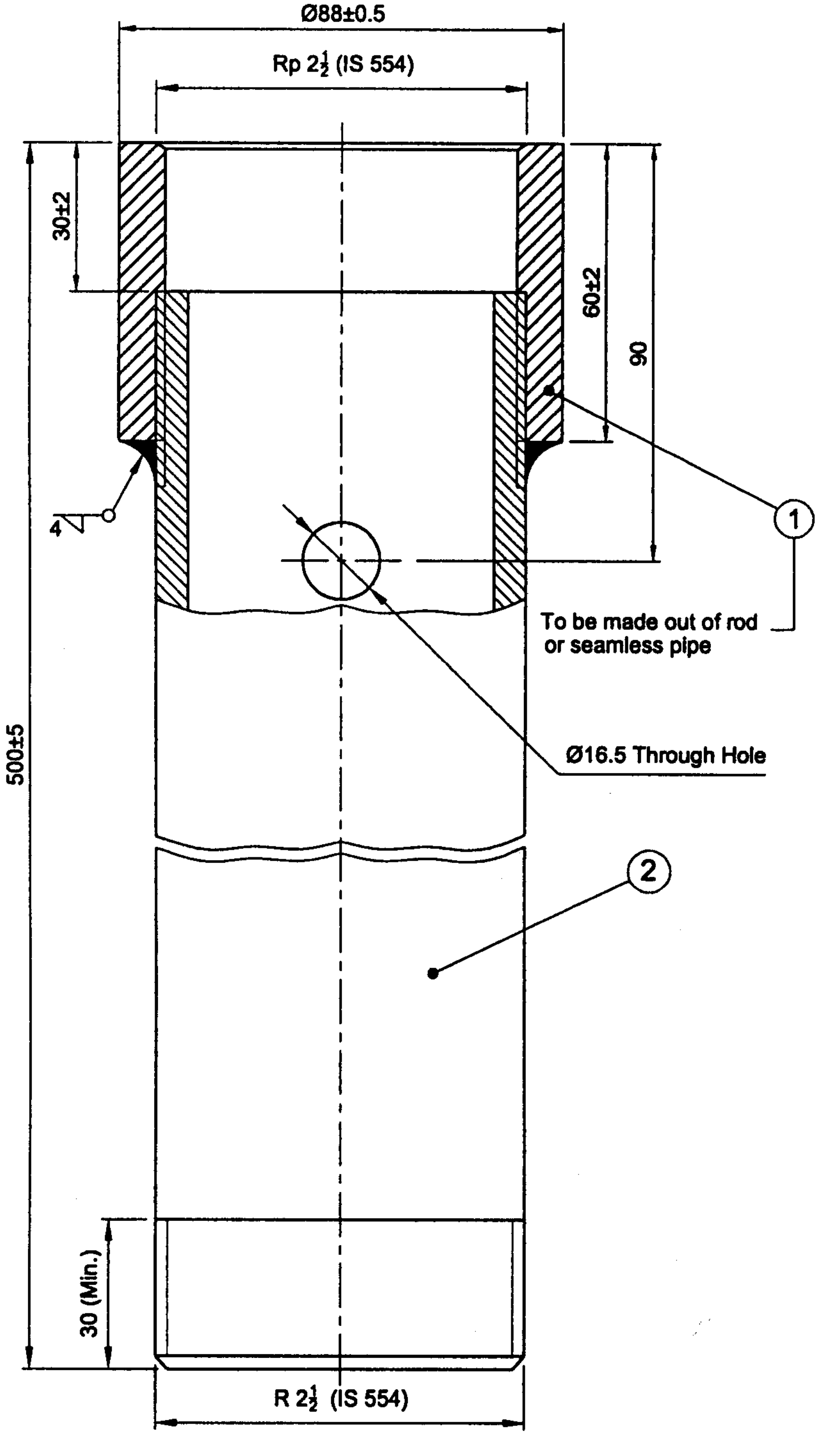


2	1	Pipe, 50 NB	Mild Steel	IS 1239 (Part 1) — Medium
1	1	Pipe Coupler	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

8.3.1A Water Tank Lifter — VLOM-50

FIG. 8.3.1 WATER TANK LIFTER (*Continued*)

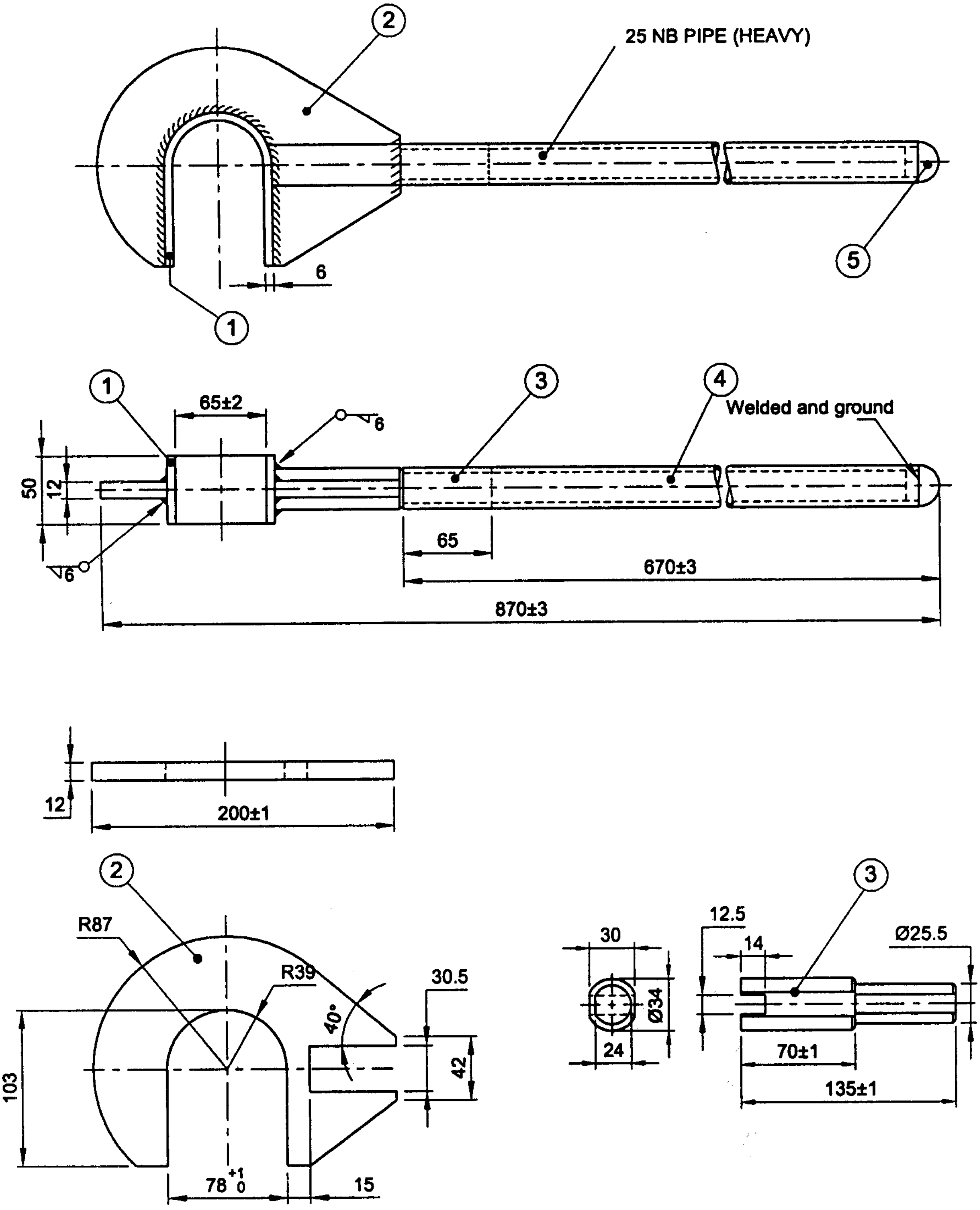


2	1	Pipe, 65 NB	Mild Steel	IS 1239 (Part 1) — Medium
1	1	Pipe Coupler	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

8.3.1B Water Tank Lifter — VLOM-65

FIG. 8.3.1 WATER TANK LIFTER (*Concluded*)

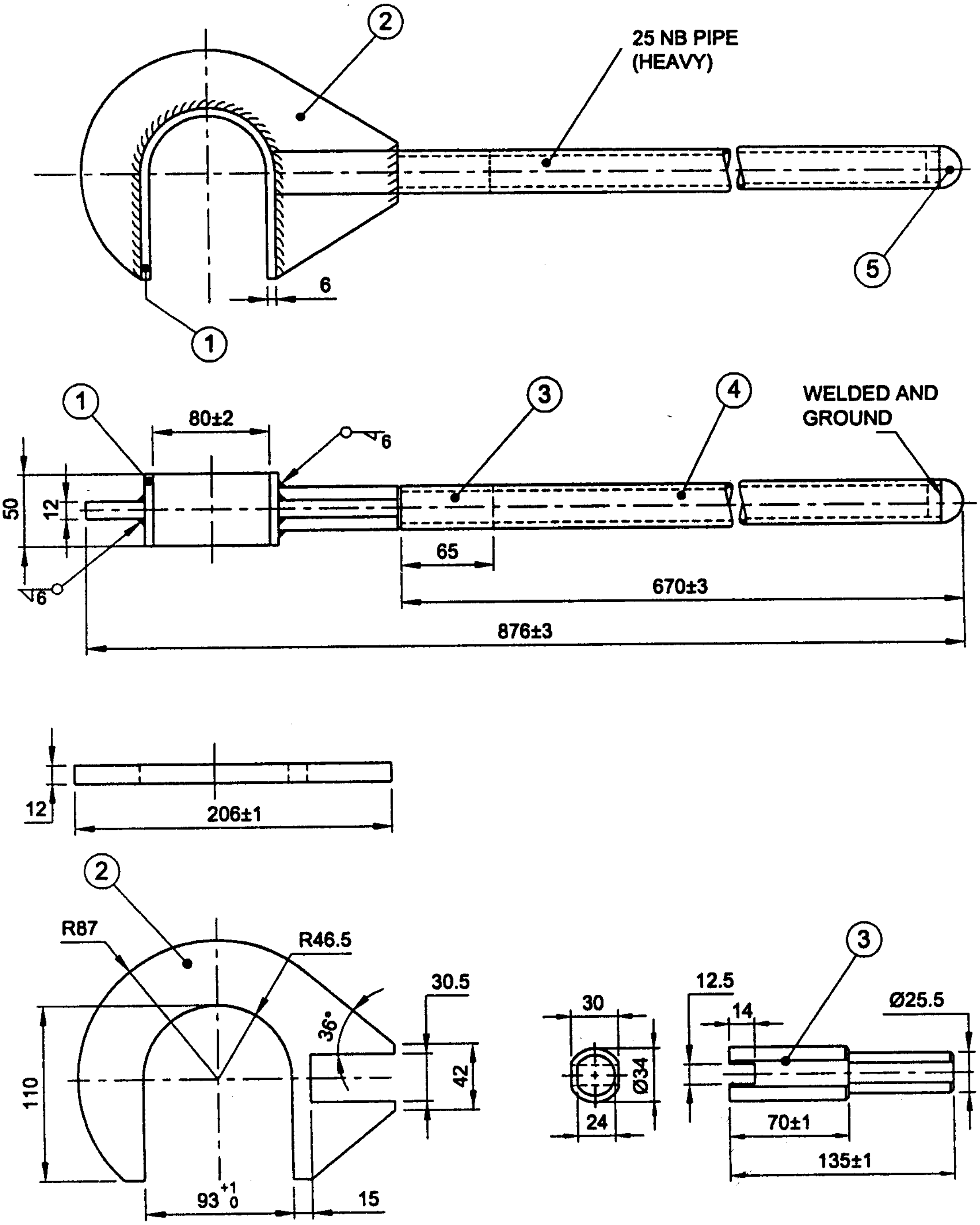


5	1	End Plug	Mild Steel	Grade A of IS 2062
4	1	Pipe, 25 NB	Mild Steel	IS 1239 (Part 1) — Heavy
3	1	Split Rod	Mild Steel	Grade A of IS 2062
2	1	Hook Plate	Mild Steel	Grade A of IS 2062
1	1	'U' Plate	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Material**	

All dimensions in millimetres.

8.3.2A Pipe Lifting Spanner — VLOM-50

FIG. 8.3.2 PIPE LIFTING SPANNER (*Continued*)

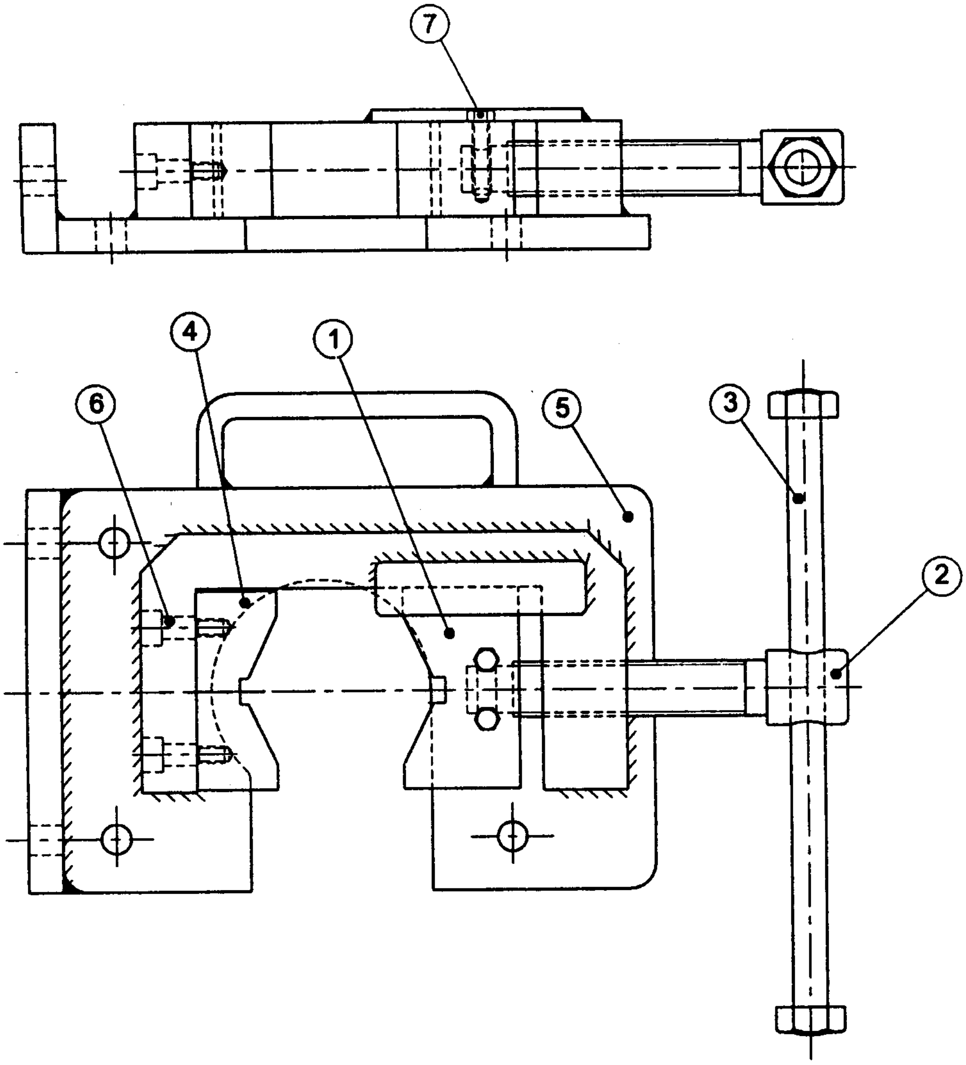


Part No.	No. Off	Description	Material	
5	1	End Plug	Mild Steel	Grade A of IS 2062
4	1	Pipe, 25 NB	Mild Steel	IS 1239 (Part 1) — Heavy
3	1	Split Rod	Mild Steel	Grade A of IS 2062
2	1	Hook Plate	Mild Steel	Grade A of IS 2062
1	1	'U' Plate	Mild Steel	Grade A of IS 2062

All dimensions in millimetres.

8.3.2B Pipe Lifting Spanner — VLOM-65

FIG. 8.3.2 PIPE LIFTING SPANNER (*Concluded*)



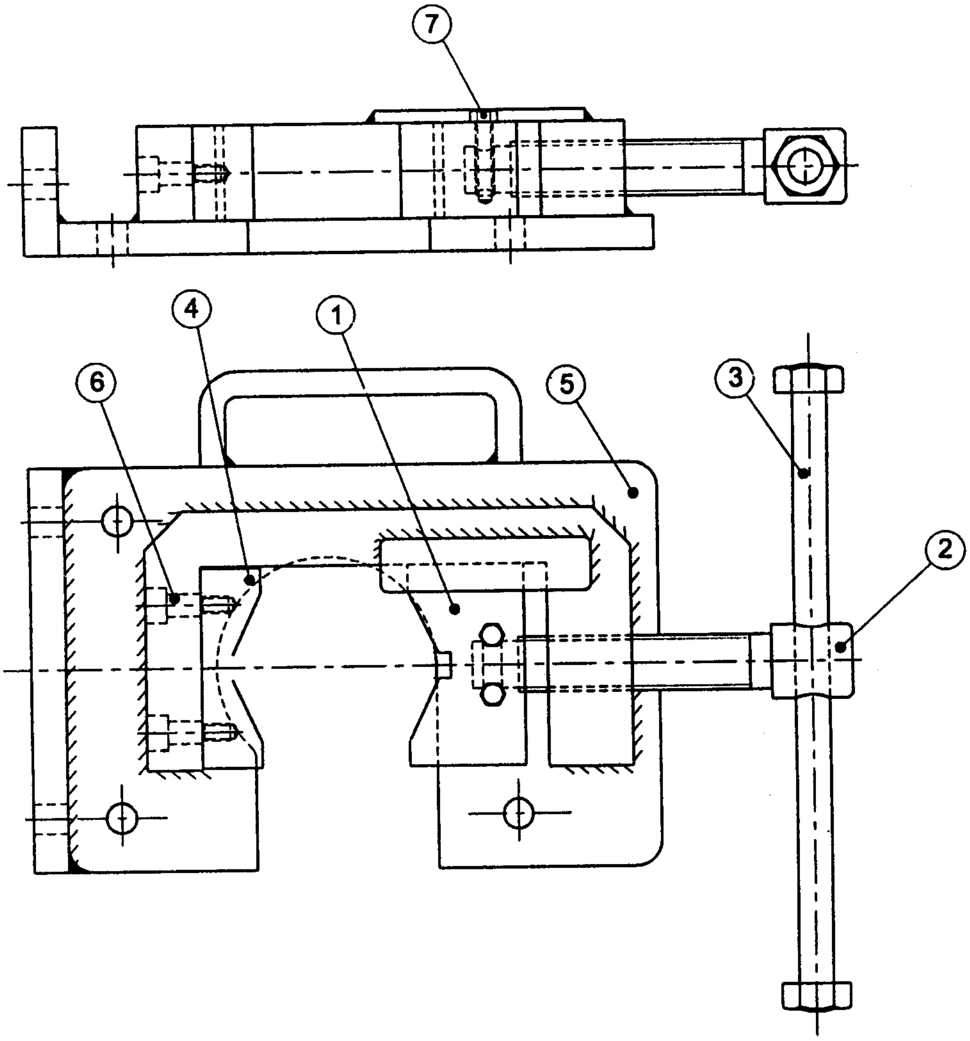
Part No.	No. Off	Description	Reference	Material	
7	1	Hex. Bolt M8 × 30	Std 07	Steel	IS 1363 (Part 1)
6	2	Hexagon Socket Head Cap Screw M10 × 25	Std 08	Steel	IS 2269
5	1	Clamp Base Assembly	Fig. 8.3.4E	Mild Steel	Grade A of IS 2062
4	1	Fixed Jaw	Fig. 8.3.4D	Mild Steel	Grade A of IS 2062
3	1	Handle	Fig. 8.3.4C	Mild Steel	Grade A of IS 2062
2	1	Threaded Shaft	Fig. 8.3.4B	Mild Steel	Grade A of IS 2062
1	1	Movable Jaw	Fig. 8.3.4A	Mild Steel	Grade A of IS 2062

NOTE — This clamp is suited up to 45 m depth application. Alternative pipe clamp arrangements may be used for application beyond 45 m.

All dimensions in millimetres.

8.3.3A Heavy Duty Clamp — VLOM-50

FIG. 8.3.3 HEAVY DUTY CLAMP (*Continued*)



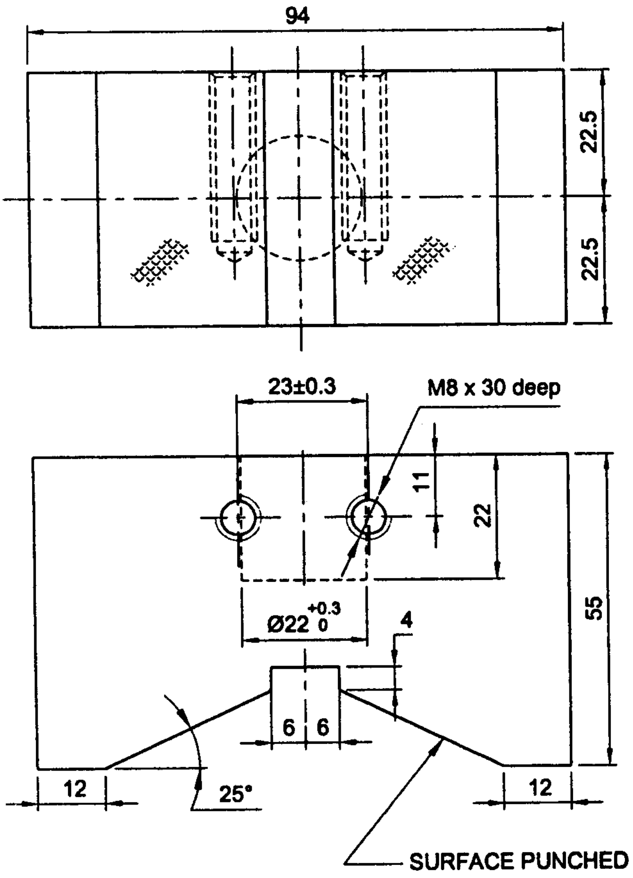
Part No.	No. Off	Description	Reference	Material	
7	1	Hex. Bolt M8 × 30	Std 07	Steel	IS 1363 (Part 1)
6	2	Hexagon Socket Head Cap Screw M10 × 25	Std 08	Steel	IS 2269
5	1	Clamp Base Assembly	Fig. 8.3.4E	Mild Steel	Grade A of IS 2062
4	1	Fixed Jaw	Fig. 8.3.4D	Mild Steel	Grade A of IS 2062
3	1	Handle	Fig. 8.3.4C	Mild Steel	Grade A of IS 2062
2	1	Threaded Shaft	Fig. 8.3.4B	Mild Steel	Grade A of IS 2062
1	1	Movable Jaw	Fig. 8.3.4A	Mild Steel	Grade A of IS 2062

NOTE — This clamp is suited up to 30 m depth application. Alternative pipe clamp arrangements may be used for application beyond 30 m.

All dimensions in millimetres.

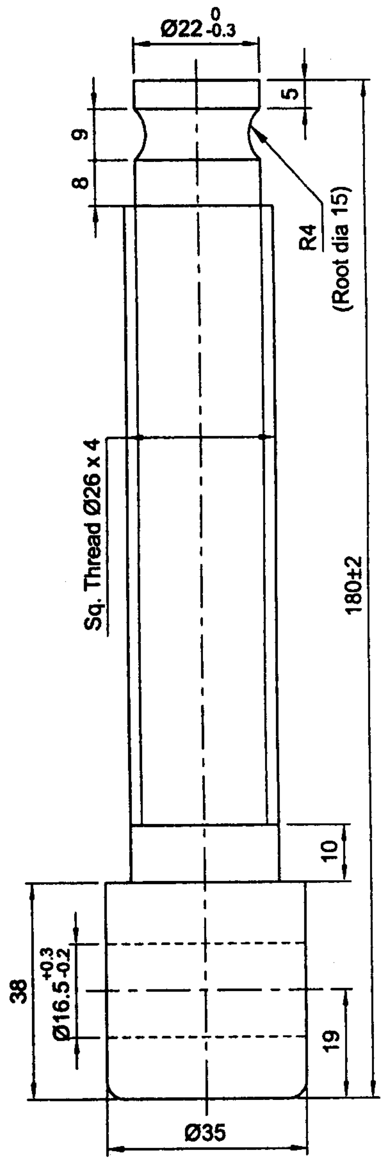
8.3.3B Heavy Duty Clamp — VLOM-65

FIG. 8.3.3 HEAVY DUTY CLAMP (*Concluded*)

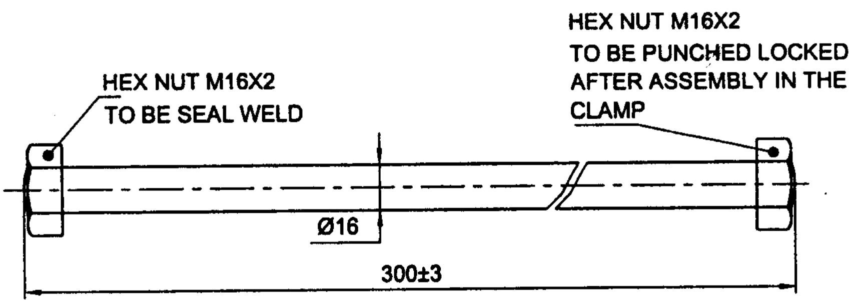


CARBURISED AND HARDENED TO 40-45 HRC

8.3.4A Movable Jaw



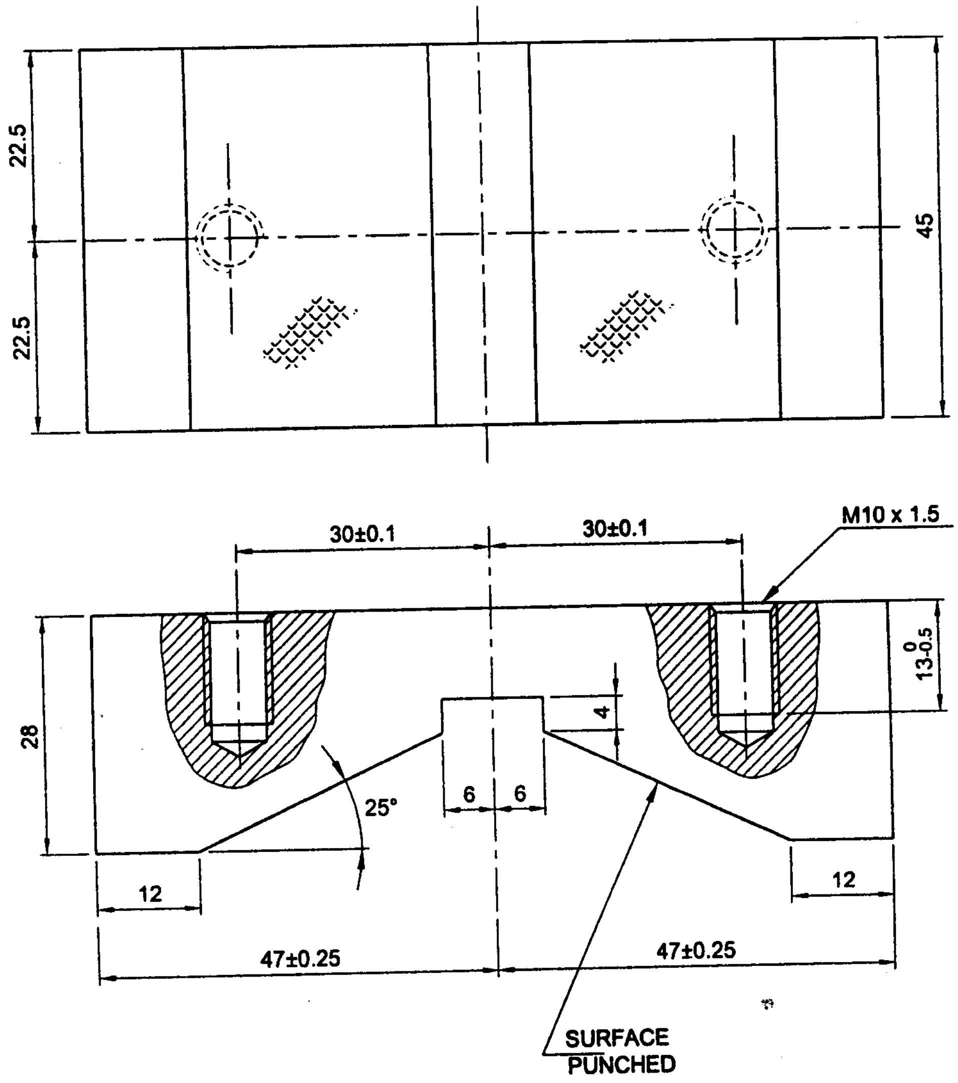
8.3.4B Threaded Shaft



8.3.4C Handle

All dimensions in millimetres.

FIG. 8.3.4 HEAVY DUTY CLAMP PARTS (*Continued*)

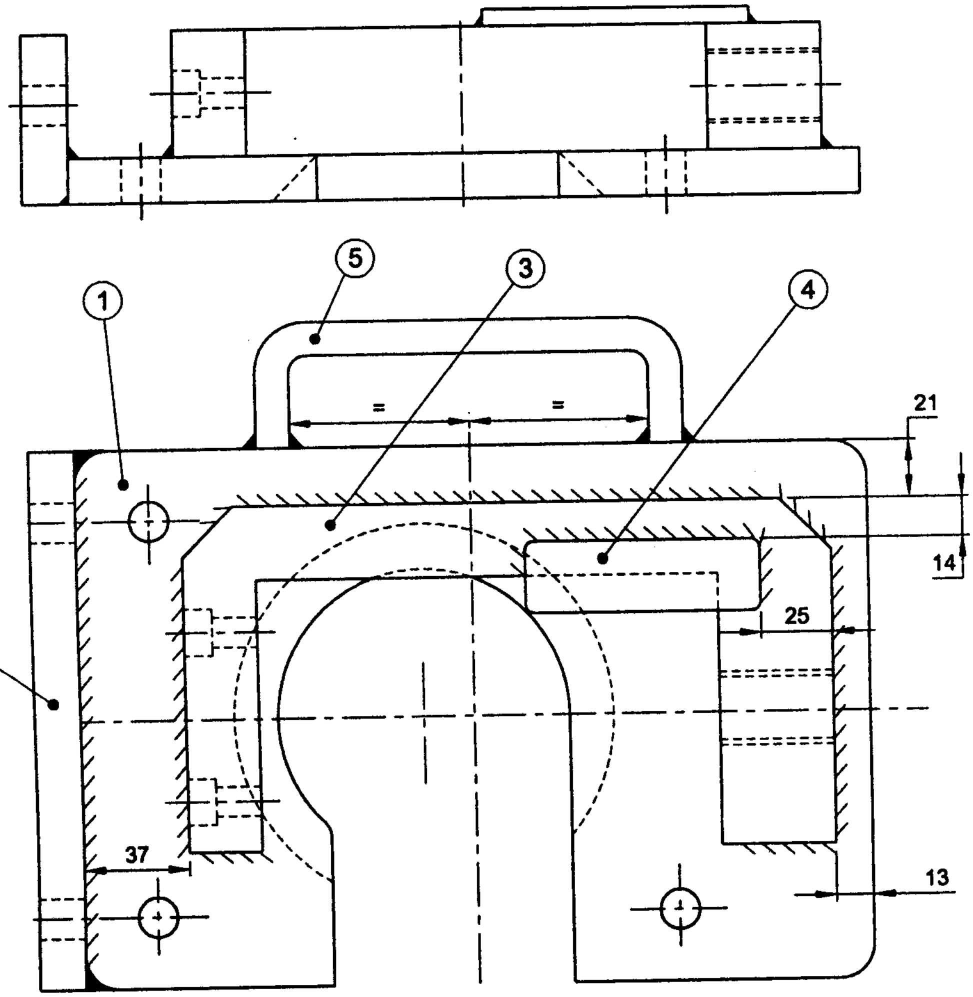


Carburised and hardened to 40-45 HRC

8.3.4D Fixed Jaw — VLOM-65

All dimensions in millimetres.

FIG. 8.3.4 HEAVY DUTY CLAMP PARTS (*Continued*)

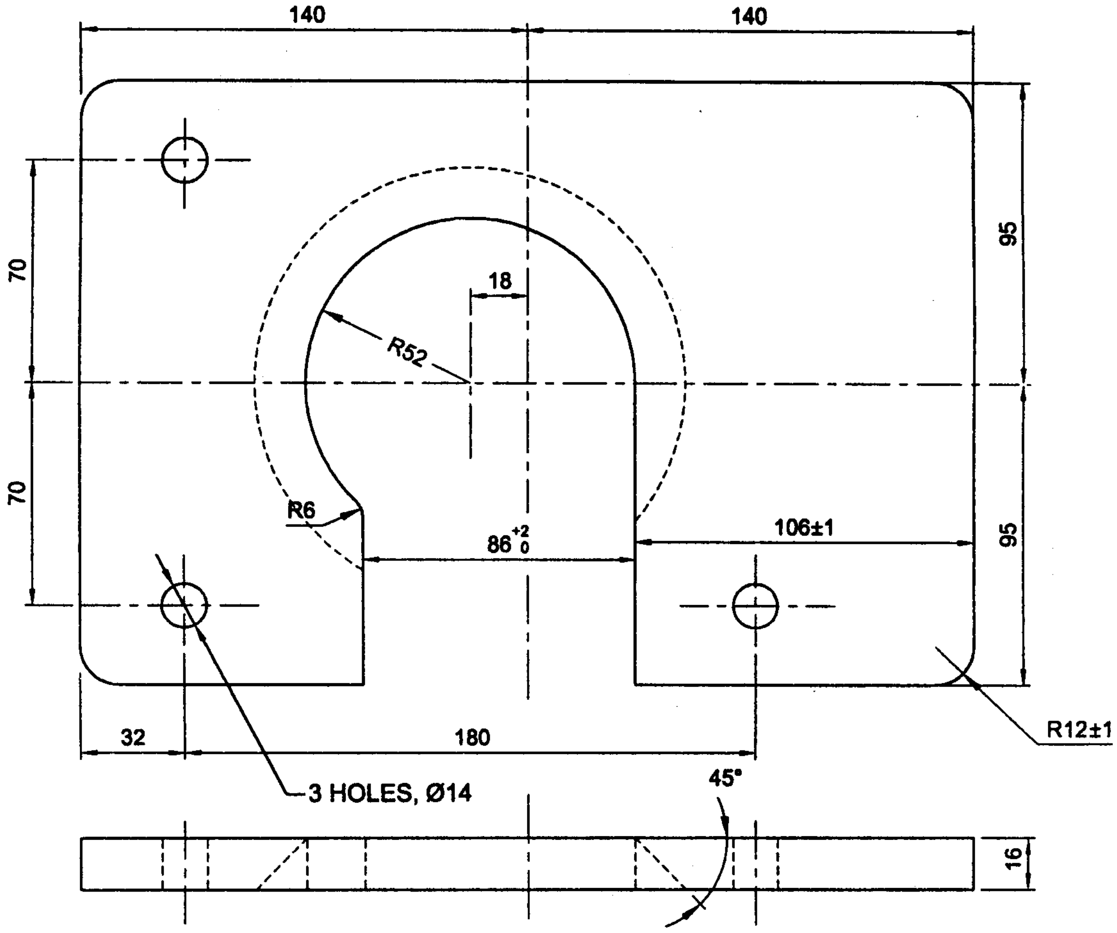


5	1	Carrying Handle	Fig. 8.2.5E	Mild Steel	Grade A of IS 2062
4	1	Guide Plate	Fig. 8.2.5D	Mild Steel	Grade A of IS 2062
3	1	Supporting Block	Fig. 8.2.5C	Mild Steel	Grade A of IS 2062
2	1	Side Plate	Fig. 8.2.5B	Mild Steel	Grade A of IS 2062
1	1	Base Plate	Fig. 8.2.5A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

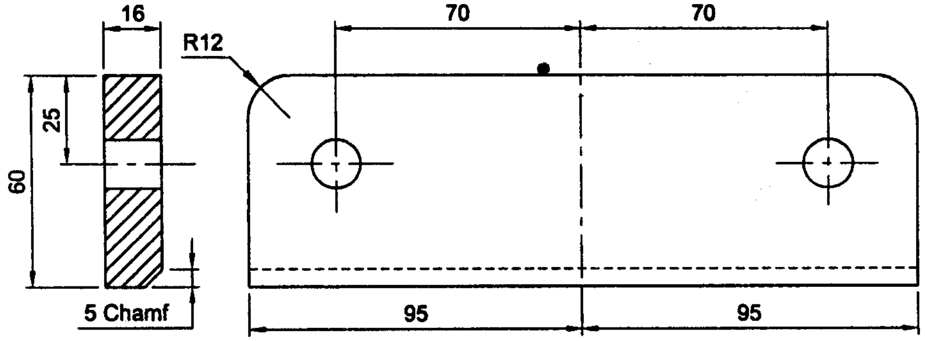
8.3.4E Clamp Base Assembly

All dimensions in millimetres.

FIG. 8.3.4 HEAVY DUTY CLAMP PARTS (*Concluded*)



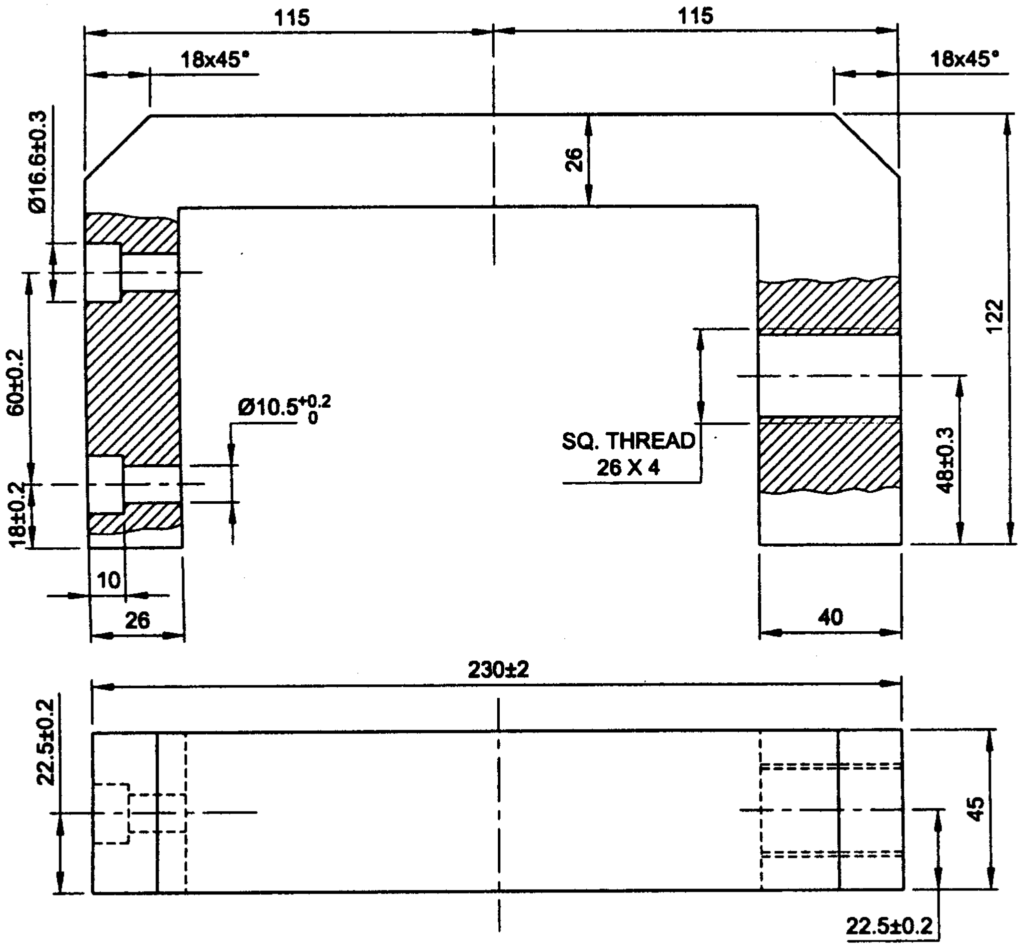
8.3.5A Base Plate



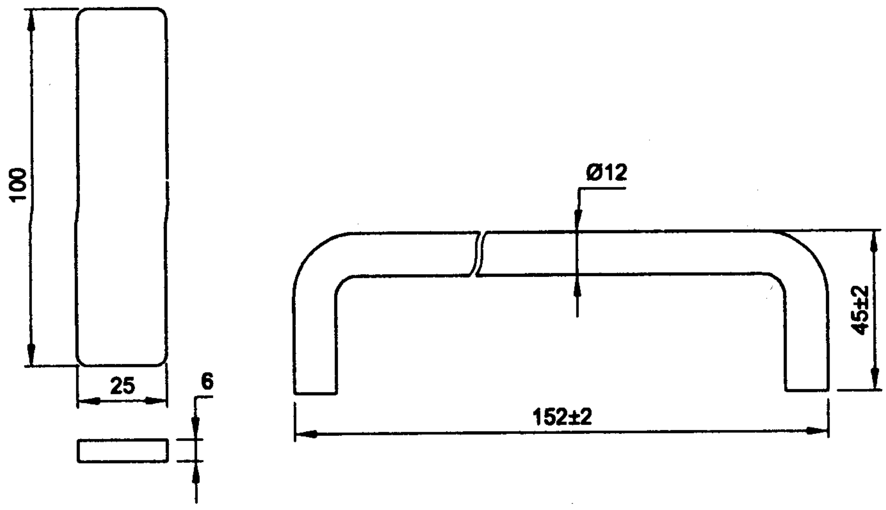
8.3.5B Side Plate

All dimensions in millimetres.

FIG. 8.3.5 CLAMP BASE ASSEMBLY PARTS (*Continued*)



8.3.5C Supporting Block

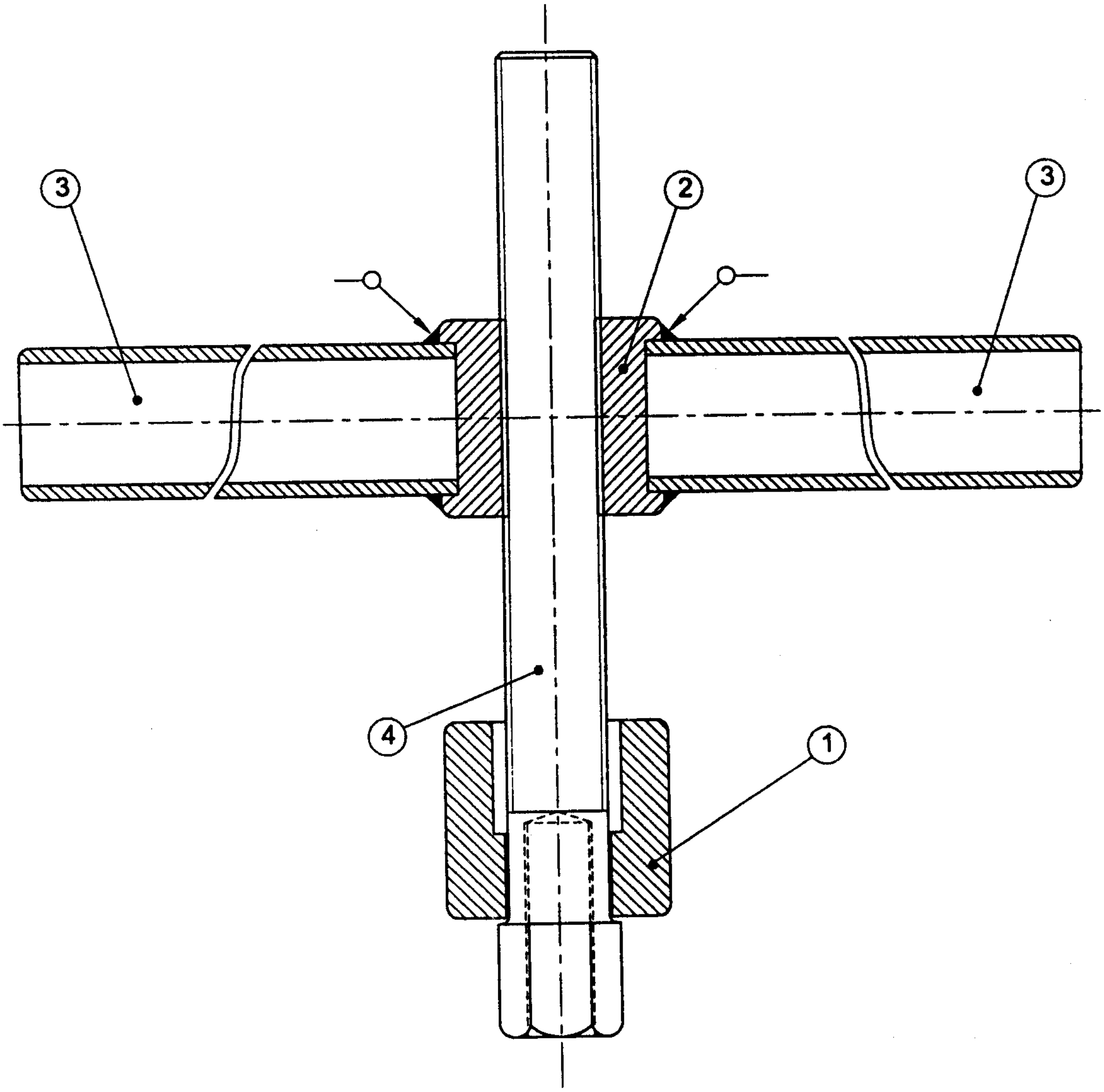


8.3.5D Guide Plate

8.3.5E Carrying Handle

All dimensions in millimetres.

FIG. 8.3.5 CLAMP BASE ASSEMBLY PARTS (*Concluded*)



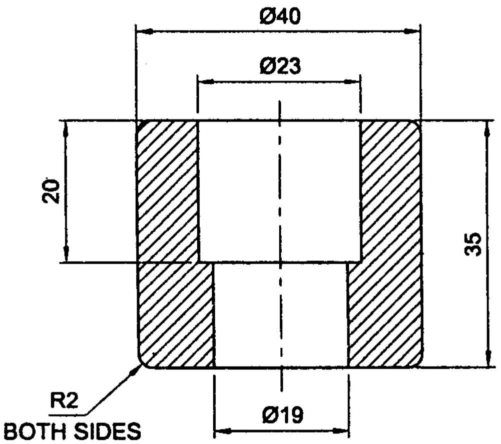
4	1	Threaded Shaft	Fig. 8.3.7D	Mild Steel	Grade A of IS 2062
3	2	Handle	Fig. 8.3.7C	Mild Steel	IS 1239 (Part 1)—Medium
2	1	Threaded Bush	Fig. 8.3.7B	Mild Steel	Grade A of IS 2062
1	1	Plain Bush	Fig. 8.3.7A	Mild Steel	Grade A of IS 2062
Part No.	**No. Off**	**Description**	**Reference**	**Material**	

NOTES

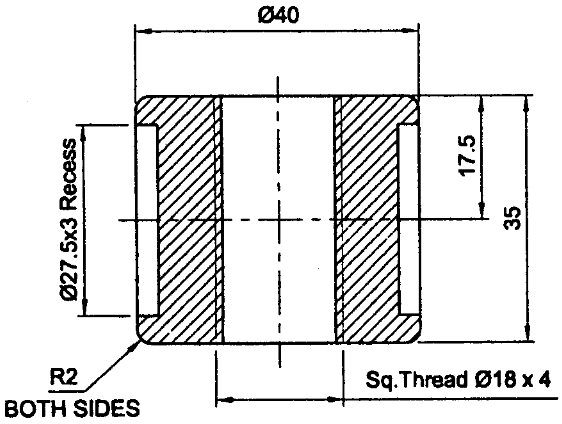
1 Items 1 and 4 to be carburized and hardened to 40-45 HRC.

2 All parts to be electrogalvanized to Service Grade No. 3 of IS 1573 and passivated.

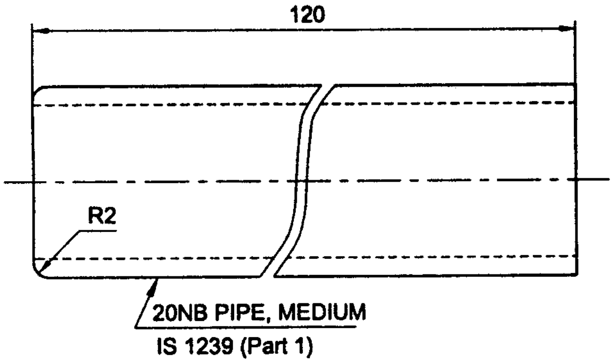
FIG. 8.3.6 CHECK VALVE PULLER



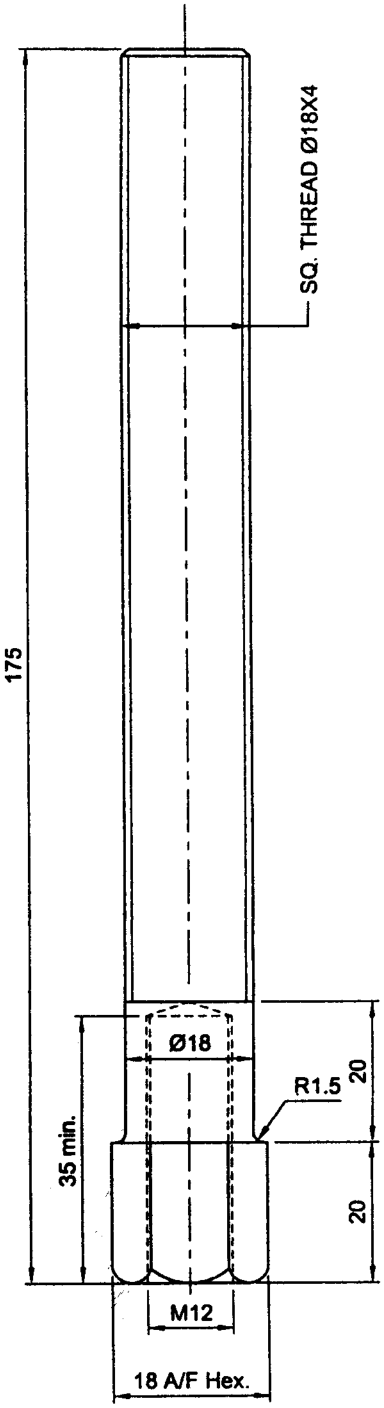
8.3.7A Plain Bush



8.3.7B Threaded Bush



8.3.7C Handle



8.3.7D Threaded Shaft

All dimensions in millimetres.

FIG. 8.3.7 PARTS OF CHECK VALVE PULLER

ANNEX A

(*Clause* 2 of Part 1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
210 : 1993	Grey iron castings (*fourth revision*)
318 : 1981	Leaded tin bronze ingots and castings (*second revision*)
407 : 1981	Brass tubes for general purposes (*third revision*)
513 : 1994	Cold rolled low carbon steel sheets and strips (*fourth revision*)
549 : 1974	Split pins (*second revision*)
554 : 1999	Pipe threads where pressure-tight joints are made on the threads — Dimensions, tolerances and designation (*fourth revision*)
808 : 1989	Dimensions for hot rolled steel beam, column, channel and angle sections (*third revision*)
1161 : 1998	Steel tubes for structural purposes (*fourth revision*)
1239	Mild steel tubes, tubular and other wrought steel fittings:
(Part 1) : 1990	Mild steel tubes (*fifth revision*)
(Part 2) : 1992	Mild steel tubular and other wrought steel pipe fittings (*fourth revision*)
1363	Hexagon head bolts, screws and nuts of product Grade C:
(Part 1) : 2002	Hexagon head bolts (size range M5 to M64) (*fourth revision*)
(Part 3) : 2002	Hexagon nuts (size range M5 to M64) (*fourth revision*)
1364 (Part 1) : 2002	Hexagon head bolts, screws and nuts of product Grades A & B: Part 1 Hexagon head bolts (size range M1.6 to M64) (*fourth revision*)
1367	Technical supply conditions for threaded steel fasteners:
(Part 2) : 2002	Tolerances for fasteners bolts, screws, studs and nuts—Product Grades A, B and C (*third revision*)
(Part 11) : 2002	Electroplated coatings (*third revision*)
(Part 14/Sec 1) : 2002	Mechanical properties of corrosion resistance stainless steel fasteners, Section 1 Bolts, screws and studs (*third revision*)
(Part 14/Sec 2) : 2000	Mechanical properties of corrosion resistance stainless steel fasteners, Section 2 Nuts (*third revision*)
1573 : 1986	Electroplated coatings of zinc on iron and steel (*second revision*)
2030 : 1989	Box spanners (*second revision*)
2062 : 1999	Steel for general structural purposes — Specification (*fifth revision*)
2074 : 1992	Ready mixed paints, air drying, red oxide zinc chrome, priming (*second revision*)
2102 (Part 1) : 1993	General tolerances : Part 1 Tolerances for linear and angular dimensions without individual tolerance indications (*third revision*)
2269 : 1995	Fasteners — Hexagon socket head cap screws (*third revision*)
2403 : 1991	Short pitch transmission precision steel roller chains and chain wheels (*second revision*)
2500 (Part 1) : 2000	Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (*third revision*)
2629 : 1985	Recommended practice for hot dip galvanizing on iron and steel (*first revision*)
2643 : 1999	Pipe threads where pressure-tight joints are not made on threads — Dimensions, tolerances and designation (*second revision*)
2811 : 1987	Recommendations for manual tungsten inert gas arc welding of stainless steel (*first revision*)
2932 : 1993	Enamel, synthetic, exterior (a) undercoating, (b) finishing (*second revision*)
3400	Methods of test for vulcanized rubbers:
(Part 1) : 1987	Tensile stress-strain properties (*second revision*)
(Part 2) : 1995	Hardness (*second revision*)
(Part 6) : 1983	Resistance to liquids (*first revision*)
(Part 10) : 1977	Compression set at constant strain (*first revision*)
(Part 22) : 1984	Chemical analysis
3428 : 1981	Dimensions for relief grooves (*first revision*)
4454	Steel wires for mechanical springs:
(Part 1) : 2001	Patented and cold drawn steel wires, unalloyed (*third revision*)

IS No.	*Title*
4695	Knuckle screw threads:
(Part 1) : 1988	Thread profiles and nominal dimensions (*first revision*)
(Part 2) : 1988	Deviations and tolerances (*first revision*)
4740 : 1979	Code of practice for packaging of steel tubes (*first revision*)
4759 : 1996	Hot-dip zinc coatings on structural steel and other allied products (*third revision*)
5206 : 1983	Covered electrodes for manual arc welding of stainless steel and other similar high alloy steels (*first revision*)
5517 : 1993	Steels for hardening and tempering (*second revision*)
6455 : 1972	Single row radial ball bearings
6603 : 2001	Stainless steel bars and flats (*first revision*)
6912 : 1985	Copper and copper alloys forging stock and forgings (*first revision*)
7002 : 1991	Prevailing torque type steel hexagon locknut (with non-metallic insert) style 1 Property classes 5, 6 and 10 — Specification (*first revision*)
9550 : 1980	Bright bars
9595 : 1996	Metal arc welding of carbon and carbon manganese steels — Recommendations (*first revision*)
9839 : 1981	Chromate conversion coating on electroplated zinc and cadmium coatings
14962 (Part 3) : 2001	ISO general purpose metric screw threads — Tolerances: Part 3 Deviation for constructional screw threads

ANNEX B

(*Clause* 4.6 of Part 1)

STANDARD COMPONENTS

Sl No.	ID No.	Part Description		Ref to IS No.
		Name	Size	
i)	Std 01	Hexagonal nut (stainless steel)	M6 × 1	IS 1367 (Part 14/Sec 2)
ii)	Std 02	Hexagonal lock nut	M8 × 1.25	IS 1363 (Part 3)
iii)	Std 03	Prevailing torque type steel hexagonal nut	M10 × 1.5	IS 7002
iv)	Std 04	Hexagonal nut	M12 × 1.75	IS 1363 (Part 3)
v)	Std 05	Hexagonal bolt (stainless steel)	M6 × 1 × 28	IS 1367 (Part 14/Sec 1)
vi)	Std 06	Hexagonal bolt	M8 × 1.25 × 20	IS 1363 (Part 1)
vii)	Std 07	Hexagonal bolt	M8 × 1.25 × 30	IS 1363 (Part 1)
viii)	Std 08	Hexagonal socket head cap screw	M10 × 1.5 × 25	IS 2269
ix)	Std 09	Hexagonal bolt	M10 × 1.5 × 40	IS 1364 (Part 1) (Property class 8.8)
x)	Std 10	Hexagonal bolt	M12 × 1.75 × 20	IS 1363 (Part 1)
xi)	Std 11	Hexagonal bolt	M12 × 1.75 × 30	IS 1364 (Part 1) (Property class 10.9)
xii)	Std 12	Hexagonal bolt	M12 × 1.75 × 40	IS 1363 (Part 1)
xiii)	Std 13	Hexagonal bolt	M12 × 1.75 × L 1)	IS 1363 (Part 1)
xiv)	Std 14	Split pin	Ø6 × 45	IS 549
xv)	Std 15	Ball bearing, single side shielded	20 BC 02 PP	IS 6455
xvi)	Std 16	Roller chain (ISO 16B)	25.4 mm pitch	IS 2403

1) The length L of this bolt will depend upon the number of counter weights used in the extra deepwell pump.

ANNEX C

(*Clause* 12.1 of Part 1)

RECOMMENDED PACKAGING PROCEDURE

Sl No.	**Sub-assembly/Component**		**Individual Packing**	**Bulk Packing**
	Identification/ Figure No.	Nomenclature		
(1)	(2)	(3)	(4)	(5)
1.	3.1	Head Assembly — Standard	Covered with polyethylene bag, wrapped in straw rope with hessian cover	—
2.	3.2	Handle Assembly — Standard		
3.	3.3	Head Assembly — EDWP		
4.	3.4	Handle Assembly — EDWP		
5.	3.5	Cylinder Assembly — Standard	Polyethylene bag	Cardboard box (maximum three numbers per box)
6.	3.6A	Upper Valve Assembly — Standard	Polyethylene bag, individually packed in cardboard carton	Cardboard box
7.	3.6B	Lower Valve Assembly — Standard		
8.	3.7	Cylinder Assembly — VLOM-65	Polyethylene bag	Cardboard box (maximum three numbers per box)
9.	3.8A	Upper Valve Assembly — VLOM-65	Polyethylene bag, individually packed in cardboard carton	Cardboard box
10.	3.8B	Lower Valve Assembly — VLOM-65		
11.	3.9	Cylinder Assembly — VLOM-50	Polyethylene bag	Cardboard box (maximum three numbers per box)
12.	3.10A	Upper Valve Assembly — VLOM-50	Polyethylene bag, individually packed in cardboard carton	Cardboard box
13.	3.10B	Lower Valve Assembly — VLOM-50		
14.	3.11	Cylinder Assembly — EDWP	Polyethylene bag	Cardboard box (maximum three numbers per box)
15.	3.12A	Upper Valve Assembly — EDWP	Polyethylene bag, individually packed in cardboard carton	Cardboard box
16.	3.12B	Lower Valve Assembly — EDWP		
17.	4.1	Head — Standard	Covered with polyethylene bag, wrapped in straw rope with hessian cover	—
18.	4.2	Head — EDWP		
19.	4.4	Cover	Polyethylene bag	Wooden crate (maximum 32 numbers per crate)

Sl No.	**Sub-assembly/Component**		**Individual Packing**	**Bulk Packing**
	Identification/ Figure No.	Nomenclature		
(1)	(2)	(3)	(4)	(5)
20.	4.5	Third Plate	Polyethylene bag	Hessian bag with straw packing (maximum weight not to exceed 50 kg per pack)
21.	4.6	Handle — Standard	Covered with polyethylene bag, wrapped in straw rope with hessian cover	—
22.	4.7	Handle — EDWP		
23.	4.9	Chain with coupling	Polyethylene bag (*see also* **C-6.2**)	Cardboard box
24.	4.10	T-bar — EDWP	Polyethylene bag	Hessian cover (maximum weight not to exceed 50 kg per pack)
25.	4.11	Counter Weight — EDWP		
26.	4.12	Stand — Standard	Covered with polyethylene bag, wrapped in straw rope with hessian cover. M12×40 bolt with two nuts to be provided in each hole of top flange	—
27.	4.13	Stand — EDWP		
28.	4.15	Water Tank — 32		
29.	4.16	Water Tank — 50		
30.	4.17	Water Tank — 65		
31.	4.19	Cone Plate — VLOM-65	Polyethylene bag	Hessian bag with straw packing (maximum weight not to exceed 50 kg per pack)
32.	4.20	Cone Plate — VLOM-50		
33.	4.21	Connecting Rod	Polyethylene (up to ten rods per bag) (*see also* **A-11.3**)	Hessian cover (maximum ten numbers per pack)
34.	4.22	Plunger Rod — Standard	Polyethylene (up to ten rods per bag) (*see also* **A-11.3**)	Hessian cover (maximum twenty numbers per pack)
35.	4.23	Plunger Rod — Long		
36.	4.24	Handle Axle	Polyethylene sleeve with thread protector	Cardboard box
37.	4.25	Push Rod	Polyethylene bag (up to 50 numbers per pack)	Cardboard box
38.	4.26	Bearing Spacer	Polyethylene bag (up to 20 numbers per pack)	Cardboard box
39.	4.27	Washer	Polyethylene bag (up to 100 numbers per pack)	Cardboard box
40.	4.28	Socket 32 NB, seamless	Polyethylene cover	Cardboard box
41.	4.29	Socket 50 NB, seamless		
42.	4.30	Socket 65 NB, seamless		
43.	5.1 and 6.1A	Cylinder Body with Liner — Standard	Polyethylene bag with thread protector	Cardboard box (maximum weight not to exceed 50 kg per pack)
44.	5.2 and 5.1B	Cylinder Body with Liner — Long		
45.	5.3 and 6.1C	Cylinder Body with Liner — VLOM-50		

Sl No.	Sub-assembly/Component		Individual Packing	Bulk Packing
	Identification/ Figure No.	Nomenclature		
(1)	(2)	(3)	(4)	(5)
46.	5.4	Reducer Cap	Polyethylene bag	Cardboard box
47.	5.5A/ 5.5B	Cylinder Caps — VLOM-65		
48.	5.6A/ 5.6B	Cylinder Caps — VLOM-50		
49.	6.2	Plunger Yoke Body	Polyethylene cover and cardboard carton, individually	Cardboard box
50.	6.3	Upper Valve	Polyethylene cover and cardboard carton, maximum five per pack	Cardboard box
51.	6.4	Bucket Spacer — Standard	Polyethylene cover and cardboard carton, maximum five per pack	Cardboard box
52.	6.5	Bucket Spacer — Lower		
53.	6.6	Follower — SDWP	Polyethylene cover and cardboard carton, individually	Cardboard box
54.	6.7	Follower — VLOM-65		
55.	6.8	Follower — EDWP		
56.	6.9	Check Valve — Standard	Polyethylene cover with thread protector, and cardboard carton individually	Cardboard box
57.	6.10	Check Valve — VLOM-65	Polyethylene cover and cardboard carton, maximum five per pack	Cardboard box
58.	6.11	Rubber Seat Retainer	Polyethylene cover and cardboard carton, maximum ten per pack	Cardboard box
59.	6.12	Check Valve Seat — Standard	Polyethylene cover and cardboard carton, maximum five per pack	Cardboard box
60.	6.13	Check Valve Seat — VLOM-65	Polyethylene cover and cardboard carton, individually	Cardboard box
61.	6.14	Cage — VLOM-65	Polyethylene cover and cardboard carton, individually	Cardboard box
62.	6.15	Plunger Body — VLOM-50	Polyethylene cover and cardboard carton, individually	Cardboard box
63.	6.16	Check Valve Body — VLOM-50	Polyethylene cover and cardboard carton, individually	Cardboard box
64.	7.1	Pump Bucket — Standard	Polyethylene cover and cardboard/ plastic container, maximum ten per pack	Cardboard box
65.	7.2	Pump Bucket — VLOM-50		
66.	7.3	Sealing Ring — Standard	Polyethylene cover and cardboard / plastic container, maximum 50 numbers per pack	Cardboard box
67.	7.4	Sealing Ring — VLOM-65		
68.	7.5	Sealing Ring — VLOM-50		
69.	7.6	Upper Valve Seating	Polyethylene cover and cardboard carton, maximum 100 numbers per pack	Cardboard box
70.	7.7	Lower Valve Seating — Standard		
71.	7.8	Lower Valve Seating — VLOM-65		
72.	7.9	Bobbin	Polyethylene cover and cardboard carton	Cardboard box
73.	7.10	O-Ring — VLOM-65	Polyethylene cover and cardboard carton	Cardboard box
74.	7.11	O-Ring — VLOM-50		

Sl No.	Sub-assembly/Component		Individual Packing	Bulk Packing
	Identification/ Figure No.	Nomenclature		
(1)	(2)	(3)	(4)	(5)
75.	7.12	Rubber Cone — VLOM-65	Polyethylene cover and cardboard carton	Cardboard box
76.	7.13	Rubber Cone — VLOM-50		
77.	7.14	Rubber Centralizer — VLOM-65	Polyethylene cover and cardboard carton	Cardboard box
78.	7.15	Rubber Centralizer — VLOM-50		

STANDARD COMPONENTS

Sl No.	Component		Individual Packing	Bulk Packing
	Identification/ Item No. in Annex B	Nomenclature		
79.	Std 01	Hexagonal Nut (SS) M6	Polyethylene bag, maximum 100 No. per bag	Cardboard box
80.	Std 02	Hexagonal Lock Nut M8	Polyethylene bag, maximum 100 No. per bag	Cardboard box
81.	Std 03	Nyloc Hexagonal Nut M10	Polyethylene bag, maximum 100 No. per bag	Cardboard box
82.	Std 04	Hexagonal Nut M12	Polyethylene bag, maximum 50 No. per bag	Cardboard box
83.	Std 05	Hexagonal Bolt (SS) M6 × 28	Polyethylene bag, maximum 50 No. per bag	Cardboard box
84.	Std 06	Hexagonal Bolt M8 × 20	Polyethylene bag, maximum 50 No. per bag	Cardboard box
85.	Std 07	Hexagonal Bolt M8 × 30	Polyethylene bag, maximum 50 No. per bag	Cardboard box
86.	Std 08	Hexagonal Socket Head Screw M8 × 30	Polyethylene bag, maximum 50 No. per bag	Cardboard box
87.	Std 09	Hexagonal Bolt M10 × 40-8.8	Polyethylene bag, maximum 50 No. per bag	Cardboard box
88.	Std 10	Hexagonal Bolt M12 × 20	Polyethylene bag, maximum 50 No. per bag	Cardboard box
89.	Std 11	Hexagonal Bolt M12 × 30	Polyethylene bag, maximum 50 No, per bag	Cardboard box
90.	Std 12	Hexagonal Bolt M12 × 40	Polyethylene bag, maximum 25 No. per bag	Cardboard box
91.	Std 13	Hexagonal Bolt M12 × 100	Polyethylene bag, maximum 10 No. per bag	Cardboard box
92.	Std 14	Split Pin	Polyethylene bag, maximum 100 No. per bag	Cardboard box
93.	Std 15	Ball Bearing	Polyethylene cover and cardboard carton, individually	Cardboard box

NOTE — The cardboard box for bulk supply shall be of 7 ply corrugated fibre board (CFB) made of 120 GSM kraft paper with cloth lining inside. The box shall be sufficiently strapped with 12 mm polypropylene strap. The gross weight of the box with its contents shall not exceed 25 kg.

ANNEX D

(*Clause* 1.3 of Part 8)

LIST OF TOOLS IN A SET OF SPECIAL TOOLS FOR INSTALLATION AND/OR MAINTENANCE

D-1 SET OF TOOLS FOR INSTALLATION AND MAINTENANCE OF STANDARD DEEPWELL AND EXTRA DEEPWELL HANDPUMPS

Sl No.	*Description*	*Qty*	*Figure*
i)	Connecting rod vice	1 No.	8.1.1
ii)	Axle punch	1 No.	8.1.4
iii)	Chain coupler supporting tool	1 No.	8.1.5
iv)	Crank spanner	2 No.	8.1.6
v)	Connecting rod lifter	1 No.	8.1.7/8.1.8
vi)	Bearing pressing tool	1 No.	8.1.9
vii)	Rod coupler spanner	2 No.	8.1.10
viii)	Water tank lifter	1 No.	8.2.1
ix)	Pipe lifting spanner	3 No.	8.2.2
x)	Heavy duty clamp, or	1 No.	8.2.3
	self-locking clamp	1 No.	8.2.6
xi)	Tool box	1 No.	—

D-2 SET OF TOOLS FOR INSTALLATION AND/ OR MAJOR REPAIR OF VLOM HANDPUMPS

D-2.1 For VLOM-65 Handpumps

Sl No.	*Description*	*Qty*	*Figure*
i)	Connecting rod vice	1 No.	8.1.1
ii)	Axle punch	1 No.	8.1.4
iii)	Chain coupler supporting tool	1 No.	8.1.5
iv)	Crank spanner	2 No.	8.1.6
v)	Connecting rod lifter	1 No.	8.1.7/8.1.8
vi)	Bearing pressing tool	1 No.	8.1.9
vii)	Rod coupler spanner	2 No.	8.1.10
viii)	Water tank lifter	1 No.	8.3.1
ix)	Pipe lifting spanner	3 No.	8.3.2
x)	Heavy duty clamp	1 No.	8.3.3
xi)	Check valve puller	1 No.	8.3.6
xii)	Tool box	1 No.	—

D-2.2 For VLOM-50 Handpumps

Sl No.	*Description*	*Qty*	*Figure*
i)	Connecting rod vice	1 No.	8.1.1
ii)	Axle punch	1 No.	8.1.4
iii)	Chain coupler supporting tool	1 No.	8.1.5
iv)	Crank spanner	2 No.	8.1.6
v)	Connecting rod lifter	1 No.	8.1.7/8.1.8
vi)	Bearing pressing tool	1 No.	8.1.9
vii)	Rod coupler spanner	2 No.	8.1.10
viii)	Water tank lifter	1 No.	8.3.1 A
ix)	Pipe lifting spanner	3 No.	8.3.2 A
x)	Heavy duty clamp	1 No.	8.3.3 A
xi)	Check valve puller	1 No.	8.3.6
xii)	Tool box	1 No.	—

D-3 SET OF SPECIAL TOOLS FOR MAINTENANCE OF VLOM HANDPUMPS (BOTH VLOM-65 AND VLOM-50)

Sl No.	*Description*	*Qty*	*Figure*
i)	Connecting rod vice	1 No.	8.1.1
ii)	Chain coupler supporting tool	1 No.	8.1.5
iii)	Crank spanner	2 No.	8.1.6
iv)	Connecting rod lifter	1 No.	8.1.7/8.1.8
v)	Rod coupler spanner	2 No.	8.1.10
vi)	Check valve puller	1 No.	8.3.6
vii)	Tool box	1 No.	—

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